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ABSTRACT

This document examines issues related to developing a conceptual framework for career and technical education (CTE). Section 1 sets forth the rationale. Section 2 examines historical and current traditions and views toward CTE (including the federal government's principal role in originating and shaping it through legislative mandates and funding) and describes traditional and contemporary philosophical positions regarding CTE's purpose. Section 3 reports recent educational reform efforts and examines their impact on vocational education. Section 4 discusses workforce needs in a high tech, global workplace that demand substantial change to CTE curriculum and practice if students are to be adequately prepared for work and adult life. Section 5 examines other issues that influence thinking about CTE's nature and scope in the 21st century: underlying assumptions and external influences that shape practice, previous frameworks that described the field, and emerging and future trends in CTE delivery. Section 6 describes these individual components selected as framework anchors: curriculum, instruction and delivery options, student evaluation, clientele, and program evaluation. Current and likely directions for the field and unresolved issues or potential problems are discussed. Section 7 reviews the conceptual framework and delineates specific issues pertaining to secondary and postsecondary education, particularly teacher education. (Contains 106 references and 14 endnotes.) (YLB)

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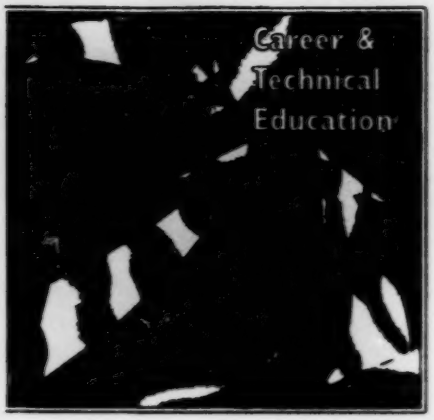

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Preparing the Workforce of Tomorrow:

A Conceptual Framework for Career and Technical Education

Jay W. Rojewski

CTE CAREER & TECHNICAL EDUCATION
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ABSTRACT

This document examines issues connected to the development of a conceptual framework for public career and technical education (CTE) in the United States. A viable conceptual framework for CTE or any other enterprise should represent consensus among its members concerning the scope, mission, and methods reflective of the profession. Such a framework should be dynamic, and subject to frequent debate and ongoing refinement. This paper, then, provides information to stimulate the debate about the present and future of CTE using the development of a conceptual framework as the vehicle for organizing and presenting critical issues. First, the parameters of a conceptual framework are clarified, e.g.: What should a conceptual framework entail? Who should develop it? How should it be used? Next, the historical record is briefly reviewed to establish a context for discussion, as well as to outline the traditional positions adopted by professionals toward the scope and mission of career and technical education. Unfortunately, the field has not moved far in its deliberations about the purpose(s) of the field. In fact, philosophic positions originally posited in the early part of the 20th century—a la Prosser and Dewey—remain the predominant positions reflected in contemporary debate. Current and projected issues that affect both secondary and postsecondary CTE are also examined. Based on available information, a tentative conceptual framework is then advanced. Finally, the implications of the proposed conceptual framework for CTE teacher preparation programs are discussed.

SECTION I.
IN SEARCH OF A CONCEPTUAL FRAMEWORK: CLARIFICATION AND PURPOSE

Increasing complexity in all facets of work, family, and community life, coupled with persistent calls for educational reform over the past several decades, present numerous challenges to professionals in career and technical education. The need to revise or eliminate outdated curriculum and develop new programs to meet emerging work or family trends is a seemingly endless occurrence. But, what drives the changes and modifications made to career and technical programs? Even more basic, what is the essential purpose of career and technical programs in an increasingly global economy requiring highly skilled and highly educated workers? Is career and technical education, as Prosser, Snedden and others argued nearly a century ago, solely a means for preparing young people for specific types of work, or, as Dewey posited, a means of academic education for living in a democratic society?[1] Do purposes differ at secondary and postsecondary levels? Where is career and technical education headed in the foreseeable future?

Answers to these questions, and many more, depend on any number of possible factors— not the least of which are the underlying philosophies, implicit assumptions, and "common vision" held by those responsible for career and technical education (e.g., local school system officials in charge of career and technical education, state-level professional associations, or college and university faculty who design and implement teacher education programs). Presumably, this information can be collected and coherently presented in a conceptual framework for career and technical education.

So then, what is a conceptual framework and what should one look like for career and technical education? Lynch (1996a) declared, "There is no agreed-upon conceptual framework or knowledge-base related to education for the workplace and workforce development that professionals or professional associations have codified as important in the preparation of teachers" (p. 8). Assuming Lynch's observation is correct, can a framework really be developed and articulated that accurately reflects career and technical education? In fact, this paper attempts to articulate a (rather than "the") conceptual framework for career and technical education based on the extant literature, current state of education reform, and projections of future direction for the economy, work/family/community demands, and career and technical education.

Miller (1996) explained that a conceptual framework contains (a) *principles,* or "generalizations that state preferred practices and serve as guidelines for program and curriculum construction, selection of instructional practices, and policy development," and (b) *philosophy,* which "makes assumptions and speculations about the nature of human activity and the nature of the world.... Ultimately, philosophy becomes a conceptual framework for synthesis and evaluation because it helps vocational educators decide what should be and what should be different" (p. xiii). Lynch's (1996b) work on vocational teacher education extends and gives structure to Miller's definition by listing major elements that should be considered for the profession, including

> the ability of its members to establish requirements for entry and training in the field; define the nature of the work, the structure of the job, and the authority that governs it; identify and codify a knowledge base, develop and monitor accountability measures; enforce a code of ethics with special concern for clients; prepare practitioners to exercise a great deal of

autonomy—and all these elements are based on interpretive and applicative knowledge. Standards, criteria, and assessment accompany each component of professional practice. (p. 15)

While past efforts, like the ones cited here, provide a basis for understanding the general purpose and potential use of a conceptual framework, any attempt to articulate one for career and technical education is fraught with potential problems regarding specific definition(s) and framework organization. Other potential points of contention include differences of opinion about the ultimate purpose(s) of career and technical education, the diversity of constituents served (e.g., the "middle third," disadvantaged youth, dropouts, displaced workers, college-bound students, etc.) and their sometimes conflicting needs, and the reliance on the federal government to provide guidance and definition.

Another issue that has substantial impact on career and technical education is the dynamic and increasingly global nature of work and the workforce, the evolving patterns of family and community living, and the need for career and technical educators to revise and update curricular content so that constituent groups are adequately prepared to meet the emerging challenges encountered in the work place, family, and community. On one hand, the flexibility required to continually update a dynamic curriculum ensures that learners are provided with cutting-edge knowledge about career options, technology, skills, and personal characteristics required to be successful in adult life. On the other hand, the need to continually update curriculum to meet changing work and family situations—deletion of outdated programs and initiation of new programs that reflect emerging occupations—has relied on federal funding and government mandate for initial direction. In many instances, theoretical and conceptual concerns regarding career and technical education have taken a back seat to changing political and economic landscapes dominated by shifting federal policies and initiatives accompanied by comparable state and local changes in program focus and mission. The dominance of federal intervention and its role in shaping career and technical education programs at all levels has resulted in a view of vocational education that is predominantly atheoretical in nature and lacking in a coherent or cohesive vision for all involved.

A conceptual framework differs from a vision statement. A vision statement projects what *may be*, *should be*, or *will be* at some point in the future and answers the questions: "What do we want to be in the future?", "What are the possibilities?", and "Where do we (or should we) invest our efforts?" In contrast, a conceptual framework should accomplish several things: (a) establish the parameters of a profession by delineating its mission and current practices, (b) account for historical events to allow understanding of how we got to where we are, (c) establish the philosophical underpinnings of the field and underscore the relationships between philosophy and practice, and (d) provide a forum for understanding needed or actual directions of the field (e.g., what could, should, or will be). A conceptual framework does not necessarily solve all problems or answer all questions present in a profession, but it should provide a schema for establishing the critical issues and allowing for solutions—either conforming the problem to the framework or vice versa (or perhaps both). Frameworks should be fairly stable, but have the capacity to change over time and adapt to external factors.

Any conceptual framework for career and technical education must be flexible enough to allow for differences in secondary or postsecondary programs and accommodate changes in the economy and society, but at the same time identify underlying assumptions, beliefs, and values that are consistent for all types of career and technical programs and are not readily subject to change. Not a small order. And, yet, despite potential problems, the need to tackle the issue of a conceptual framework for career and technical education is of paramount importance. A conceptual framework can provide practitioners, researchers, policymakers and other constituents with a common ground for understanding current endeavors and with possibilities for future ones.

Perhaps the need for a conceptual framework has never been greater, given the state of the workplace, our society, and the world, and given the demands being placed on workers and citizens for technical and higher order thinking skills. Lewis (1998) posits that two strong, related forces shape policy, discourse, and curriculum in vocational education: "(1) a global economy in which economic competitiveness is presumed to be linked with work force readiness, and (2) the changing nature of skill, work, and jobs, wrought largely by the impact of technology and by high-performance work organizations" (p. 13). Any conceptual framework of vocational education (or career and technical education)[2] must contend with these influences.

A fair amount of disagreement exists about the current mission and purpose, as well as the future direction, of career and technical education. It is interesting to note that debate over these issues has been a relatively constant theme of career and technical education since its inception in the early 1900s. Stone (2000) framed current discussion about the state and future direction of the field as follows:

> Some voices argue that it's strictly a postsecondary activity; others argue it rightly belongs in secondary schools as well. Some argue that we conceptualize vocational education too narrowly (work emphasis) and ignore other vocations (in life, family, and community, for example). Some argue that it is only a method and has no real content integrity (especially in the K-12 context). Some argue that it's only for 'those' kids. (p. 89)

Because of differing views about the nature of the field, we must recognize that for a conceptual framework to be effective and useful in (a) explaining the general purposes of career and technical education, (b) reflecting the underlying beliefs and perspectives of its constituents, and (c) shaping current activity and future direction, it cannot be developed in a vacuum. Many people and organizations must be involved to provide a comprehensive view of career and technical education and its applications in classrooms, boardrooms, living rooms, and factories. Therefore, this paper should be viewed as an initial point of departure for discussion and debate, rather than as an arrival at the final destination.

Taken as a whole, subsequent sections of this paper provide an overview of the issues and events that have influenced the nature of career and technical education from its inception to the present. The next section examines the historical and current traditions, and views toward career and technical education, including the principal role of the federal government in originating and shaping career and technical education, through legislative mandates and funding. Traditional and contemporary philosophic positions regarding the purpose of career and technical education are also described. Section 3 presents various educational reform efforts that have occurred over

the past several decades and examines their impact on vocational education. Indeed, the shape of career and technical education today is, in no small fashion, a result of the interplay of successive reform efforts over the past several decades. Another influence on the "shape" of CTE is tied to the *new economy*. Section 4 briefly discusses workforce needs in a high-tech, global workplace. These emerging needs demand substantial change to CTE curriculum and practice if students are to be adequately prepared for work and adult life. Other issues that influence thinking about the nature and scope of career and technical education in the 21st century are examined next (see Section 5). Specific topics include the underlying assumptions and external influences that shape practice, previous frameworks that have described the field, and emerging and future trends in career and technical education delivery (e.g., the new "vocationalism"). Section 6 describes the individual components that were selected as "anchors" for the conceptual framework. These components are closely tied to practice and include curriculum, instruction and delivery options, student evaluation, clientele, and program evaluation. Discussion about these components includes a look at current and likely direction for the field, as well as unresolved issues or potential problems. Finally, the conceptual framework is reviewed in its entirety, and specific issues pertaining to secondary and/or postsecondary education, particularly teacher education, are delineated (see Section 7).

SECTION II.
HISTORICAL TRADITIONS AND VIEWS TOWARD VOCATIONAL EDUCATION[3]

Nearly every contemporary written work that examines the nature, scope, and possibilities associated with career and technical education pays a fair amount of attention to the historical roots and subsequent development of vocational education. This particular work is no different. Why? A sense of history can foster an appreciation for the origins of the field, contribute to an understand of how and why program purposes and missions have changed over ensuing decades in reaction to political and economic concerns, define the current status of the field, and encourage the consideration of possible directions for the future.

> Without historical insight, vocational educational policymakers fail to gain insights into the relationship between schooling and work that the past may provide. As a result, vocational educational leaders may devote great energy to reinventing a pedagogy incapable of addressing the demands of democracy and the needs of an evolving economy....Historical consciousness can help vocational educators recognize the inherent problems in particular assumptions or particular ways of operating and facilitate the development of pragmatic alternatives. (Kincheloe, 1999, p. 93)

Two of the most important influences that have shaped vocational education, both at its inception and now, are federal legislation and philosophies about the nature of vocational education. These two areas of concern are the primary foci of this section (see Figure 1 for a timeline of significant federal legislation and reform initiatives affecting career and technical education).

Role of Federal Legislation in the Nature and Scope of Vocational Education

Career and technical education programs found in U.S. secondary and postsecondary schools exist because of federal legislation. In fact, since the beginning of federal support for public vocational education as mandated by the Smith-Hughes Act of 1917, the federal government has been a predominant influence in determining the scope and direction of vocational and technical training. In addition, the

> strong federal influence on the development, growth, and nurturing of vocational education largely remained unchanged throughout the years. Federal policy still looms large in comparison to the relatively small amounts of money the federal government contributes to support vocational education. (Lynch, 2000, p. 9)

A primary force that led to passage of the Smith-Hughes Act was economic—primarily seen in the growing need to prepare young people for jobs created as result of the industrial revolution. A secondary purpose of the Act was to provide youth with an alternative to a "classics-bound," academic-based high school curriculum. As originally envisioned, vocational education was viewed as a sequence of courses and experiences in several selected areas—agriculture, home economics, and trade and industrial education—that were designed to prepare individuals for paid and unpaid entry-level employment requiring less than a baccalaureate degree (Sarkees-Wircenski & Scott, 1995).

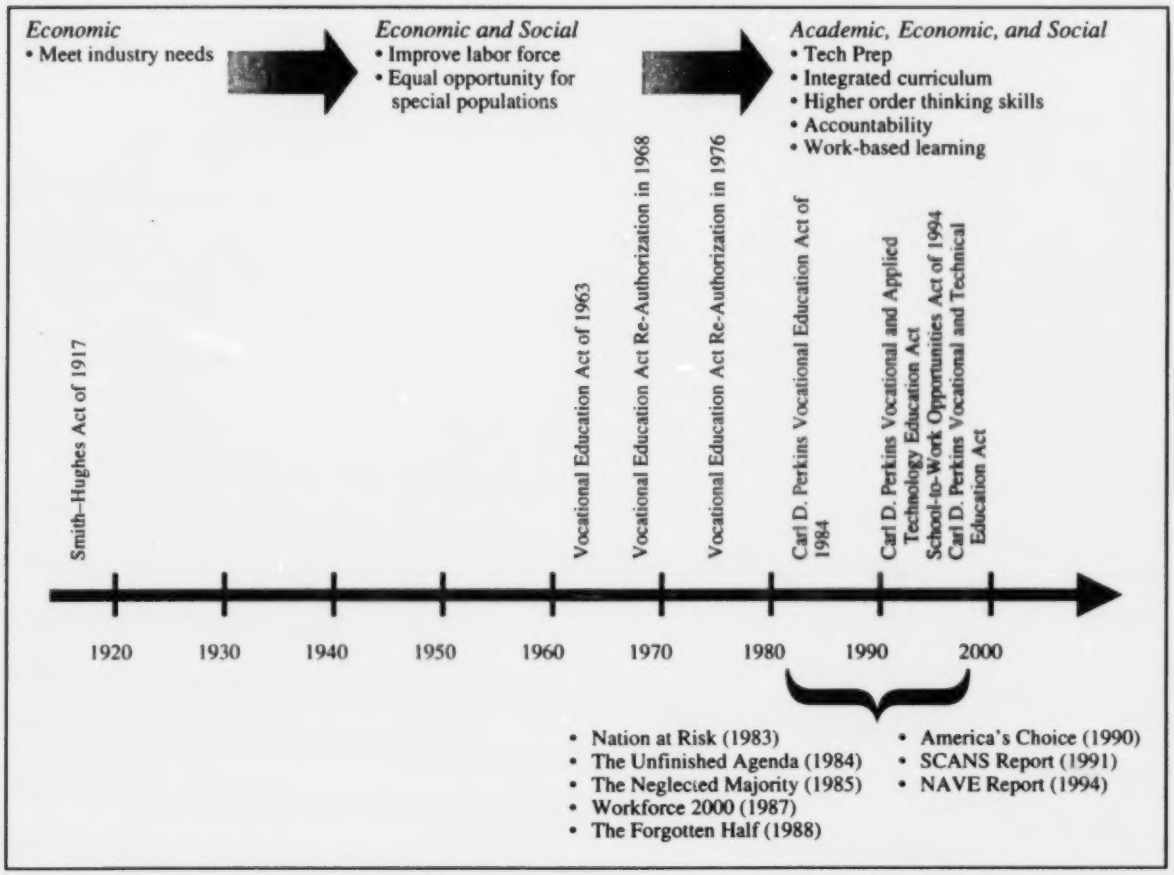

Figure 1. Timeline indicating federal legislation and educational reform initiatives that have affected the purpose(s) of career and technical education.

The Smith-Hughes Act established vocational education as a separate and distinct "system" of education that included separate state boards of vocational education, funding, areas and methods of study, teacher preparation programs and certification, and professional and student organizations. Unfortunately, the legislation "contributed to the isolation of vocational education from other parts of the comprehensive high school curriculum and established a division between practical and theoretical instruction in U.S. public schools" (Hayward & Benson, 1993, p. 3). Lewis (1998) noted that career and technical education has historically led a peculiar existence in U.S. schools; that is, serving student populations at the margins with a curriculum considered to be on the periphery. And,

> despite its grand claim of connection with labor markets, it remained the default curriculum, reserved for those assessed to be unfit for the rigors of the high-status academic subjects, which constitute the trajectory that propels one into the good high-skill/high-wage jobs in the economy. (p. 3)

For the majority of its history, vocational education has maintained a focus on entry-level work and family preparation to the exclusion of theoretical content. In recent years, this situation appears to have changed somewhat. In fact, it has only been within the past several decades, through the influence of successive waves of educational reform and federal legislation, that the precedent of sharp division between academic and vocational education (operated as dual educational tracks for college-prep and work-bound youth) has begun to be addressed (Lynch, 2000; Urquiola et al., 1997).

Vocational education, as implemented through the Smith-Hughes Act, emphasized job-specific skills to the exclusion of the traditional academic curriculum. This particular focus was championed by Charles Prosser and David Snedden who advocated an *essentialist* approach toward vocational education—firmly grounded in meeting the needs of business and industry. Eventually, Prosser believed that the purpose of public education in a democratic society was not for individual fulfillment, but to prepare its citizens to serve society and meet the labor needs of business and industry. John Dewey, a pragmatist and progressive educator, disagreed with Prosser—arguing that education should be designed to meet the needs of individuals and prepare people for life in a democratic society. Prosser's views emerged in the Smith-Hughes Act and remained the dominant philosophic position of the field until the 1960s. While the notion that learners are merely the raw materials of business and industry, molded by career and technical education programs is no longer the primary view of most educators, the view is still widely supported (Sarkees-Wircenski & Scott, 1995; Also see pp. 15–18 for additional information).

Through a series of reauthorizations to the Smith-Hughes Act, from the 1920s through the 1950s, new vocational-specific areas were added to the three original programs of home economics (now family and consumer sciences), agriculture, and trade and industrial education, including marketing, technology (formerly industrial arts), business, and health occupations education. Interestingly, while all of the programs were funded under the broad umbrella of vocational education and shared the common goal of preparing individuals for entry-level employment and adult life, each program operated separately from academic education and were fairly independent of one another (Lynch, 2000).

The passage of the Vocational Education Act of 1963 is typically heralded as signifying a major change in federal policy and direction for vocational and technical education in the U.S.—from an exclusive focus on job preparation to a shared purpose of meeting economic demands that also included a social component. This legislation was one of the first pieces of federal education legislation to recognize the educational and vocational needs of adolescents with special needs such as disability or economic disadvantage, predating federal legislation that established public special education—*The Education of All Handicapped Children Act* of 1975—by over a decade. However, no federal funds were allocated to enact this portion of the law, resulting in few structured programs for individuals with special needs (Meers, 1987; Sarkees-Wircenski & Scott, 1995). Subsequent reauthorizations of the Vocational Education Act in 1968 and 1976 strengthened the federal emphasis on serving special populations by earmarking assigned percentages of federal dollars to serve an expanding number of students with special needs—including students with limited English proficiency, academically at-risk youth, teen parents and displaced homemakers, and students in programs considered nontraditional for their gender.

The dual themes of responding to *economic* demands for a trained workforce with marketable skills and *social* concerns for making vocational programs accessible to all students, including individuals with special needs, were firmly embedded in the Carl D. Perkins Vocational Education Act of 1984. These themes were reflected in the broad aims of the law, those being (a) ensuring that vocational education programs were accessible to all students, including individuals with recognizing special needs, and (b) improving the quality of programs designed to train the work force of the future. To ensure the proper implementation of the legislation, Congress set aside 57% of all federal funds to serve six identified areas of special need, including disability, economic and academic disadvantage, displaced homemakers, limited English proficiency, incarcerated youth, and adults in need of training or retraining.

The two most recent reauthorizations of the 1984 Perkins legislation have made dramatic shifts in the direction of federal vocational education policy. "Both of these pieces of federal legislation are essentially grounded in school reform and the mandate to use federal funds to improve student performance and achievement" (Lynch, 2000, p. 10). Thus, while economic and social concerns were still prominent themes in the reauthorization of federal vocational legislation in 1990, a third broad theme—*academics*—emerged with passage of the Carl D. Perkins Vocational and Applied Technology Education Act of 1990 (also called *Perkins II*). While the commitment to special populations remained strong, it was tempered somewhat by the high level of publicity and effort devoted to increasing academic standards (in reaction to several waves of educational reform initiatives in the late 1980s and 1990s; see next section for details) in vocational programs and the elimination of federally-mandated set-asides for special populations. Some educators believed this change in emphasis has signaled one of "the most significant policy shifts in the history of federal involvement in vocational-technical education. For the first time, emphasis was placed on academic, as well as occupational, skills" (Hayward & Benson, 1993, p. 3). Several other shifts in the focus of the law have also been noted:

> A review of the Perkins II Act reveals that Prosser's philosophical beliefs, such as social efficiency and educational dualism, have given way to Dewey's philosophical views, including the creation of a more humane technological society and providing schooling that focuses on collaboration in meeting students' technological and humanistic needs. (Finch, 1999, p. 201)

An important component of the 1990 Perkins legislation, and a direct result of the renewed emphasis on academics, was the initiation of "tech-prep" (i.e., "2+2") programs—structured articulation and coordination efforts between secondary and postsecondary education institutions designed to provide vocational students with a 2-year high school program that is academically challenging, followed by a nonduplicative and sequenced 2-year postsecondary vocational program.

The School-to-Work Opportunities Act (STWOA, PL 103-239) was enacted in 1994 within the context of educational reform and the notion that American youth were not adequately prepared to meet the demands of an ever-increasing technological and globally competitive work force. The STWOA has had tremendous implications for the "look" and administration of career and technical education. Three major mandates of the law include a school-based learning component, a work-based learning component, and connecting activities. School-based learning is characterized by classroom-based instruction based on high academic and business-defined

occupational skill standards. Work-based learning involves career exploration, work experience, and structured training and mentoring at actual job sites located in one's local community. Connecting activities describe courses that integrate classroom and work-based (on-the-job) instruction, mentorships, and other means of bridging the gap between school and work. The combination of school- and work-based learning activities is designed to be relevant to a declared career major, and to lead to skill certification. Certification is a portable, industry-recognized credential that recognizes student achievement and mastery of specific skills (American Psychological Association, 1999; Paris, 1994).

The most recent incarnation of the Carl D. Perkins Vocational and Technical Education Act was signed into law in 1998. *Perkins III* continues the emphasis on improving academic achievement and preparing young people for postsecondary education *and* work. The law also reaffirms the commitment to integrate academic and vocational education, serve special populations, tech prep (extensive articulation between secondary and postsecondary programs), accountability, and expand the use of technology. New initiatives enacted through Perkins III include the need to negotiate core performance indicators. Core performance indicators include things such as student attainment of identified academic and vocational proficiencies (state academic standards); attainment of a high school diploma or postsecondary credential; placement in postsecondary education, the military, or employment; and student participation in and completion of nontraditional training and employment programs (Hartnig, 2001; Lynch, 2000).

In summary, then, while vocational education started out as a method of providing entry-level employment skills to meet the manpower needs of a nation during the height of the industrial revolution, it gradually expanded over the decades to encompass a strong social component. The emphasis on serving students with special needs reached its peak with passage of the 1984 Perkins legislation. Another somewhat overlooked component of the 1984 legislation was the mandate to improve the academic skills of vocational students. An emphasis on academic skills has been made more evident in each of the successive reauthorizations of the Perkins legislation. "The traditional focus of vocational education is giving way to a broader purpose—one that includes greater emphasis on academic preparation and provides a wider range of career choices" (Levesque, Lauen, Teitelbaum, Alt, & Librera, 2000, p. iii).

Lynch (2000) summed up the course of vocational education history from the early 1900s to the present in this manner:

> It seems increasingly clear that we have almost come full circle with federal direction of vocational education. The post-turn-of the-century legislation was enacted to prepare more students with the type of education it was thought they would need to run farms and factories in the 20th century. Today, Perkins III challenges us to prepare more students with the contemporary education they will need to work successfully in ever-changing, technologically sophisticated, and internationally competitive workplaces. In essence, today's workplaces call for an increasingly educated work force. (p. 10)

Philosophic Perspectives of Career and Technical Education

It is interesting to note that while the world has changed considerably from the early 1900s to the present in terms of work, family, and community, the basic philosophical arguments for and against various forms of vocational education (i.e., philosophic positions) have remained relatively the same. Equally unfortunate, philosophy is often shunned by workforce educators (Lerwick, 1979; Miller, 1985). Miller and Gregson (1999) recognized this situation, and asserted that to ignore philosophy in career and technical education

> is a disservice to vocational education and to philosophy, underestimating significant contributions that philosophic activity can make to vocational education and depriving the field of efforts to develop a coherent framework for thinking about, designing, implementing, and evaluating the field of practice. (p. 21)

A coherent, articulated philosophy for career and technical education can provide a lens from which to view current programs and anticipated changes. Miller (1996) suggests that philosophy is synonymous with a conceptual framework, i.e., he believes that they are one and the same. This section reflects the importance that philosophic perspectives, combined with individual perspectives and the political milieu, have had on the origins, development, current status, and future of career and technical education.

Career and technical education emerged in the early 1900s in the midst of controversy and debate about the nature of vocational training in public education. A general consensus had emerged about the importance of establishing vocational training in the public schools as an alternative to a classical, academic tradition. However, a disagreement existed about the specific design and implementation of public vocational education. Two historical figures, Charles Prosser and John Dewey, have come to represent opposing positions on the nature of vocational education.[4]

Prosser's views on social efficiency,[5] while lacking the qualities of a formal philosophic system (Miller & Gregson, 1999), posited that the major goal of school was not individual fulfillment but meeting the country's labor needs. A bulwark of social efficiency was the preparation of a well-trained, compliant workforce (Doolittle & Camp, 1999). To accomplish this goal efficiently, vocational education was organized and rigidly sequenced, an emphasis was placed on hands-on instruction delivered by people with extensive business-related experience, and program funding and administration occurred via a system that was physically and conceptually separate and distinct from academic education. While strongly supported by a majority of vocational education proponents at the time, Prosser's approach to vocational preparation has been criticized in recent years for being class-based and tracking certain segments of society—based on race, class, and gender— into second-class occupations and second-class citizenship (Lewis, 1998). Hyslop-Margison (2000) proclaimed that career and technical educators "must recognize that preparing students to fill lower strata occupational roles by providing them with instrumental skills and presenting the existing social paradigm as historical, legitimates the class stratification and social inequality inherent in the present economic structure" (p. 28).

In sharp contrast, Dewey believed that the principle goal of public education was to meet individual needs for personal fulfillment and preparation for life. This required that all students receive vocational education, be taught how to solve problems, and have individual differences equalized.

> Dewey rejected the image of students as passive individuals controlled by market economy forces and existentially limited by inherently proscribed intellectual capacities. In his view, students were active pursuers and constructors of knowledge, living and working in a world of dynamic social being. (Hyslop-Margison, 2000, p. 25)

Dewey's work is recognized as a significant part of the philosophy known as pragmatism. In the last several decades, pragmatism has been identified as the predominant philosophy of career and technical education (Miller, 1985, 1996). Change and the reaction to it are significant features of pragmatic philosophy. "Change, after all, is among the greatest of philosophic certainties for the pragmatist. To accept and even embrace change is necessary for recognition as a philosophic pragmatist, either as an individual or as a field of practice" (Miller & Gregson, 1999, p. 27). Pragmatic education seeks to prepare students to solve problems caused by change in a logical and rational manner through open-mindedness to alternative solutions and a willingness to experiment. The desired outcomes for pragmatic education are knowledgeable citizens who are vocationally adaptable and self-sufficient, participate in a democratic society, and view learning and reacting to change as lifelong processes (Lerwick, 1979). A number of current educational reform efforts, such as applied academics, contextualized teaching and learning, integrated curriculum, and authentic assessment, reflect Dewey's notion of pragmatism

Miller and Gregson (1999) cogently argued that a proactive stance to change, in the profession and society, best reflects contemporary thinking in career and technical education, and should be adopted. This position, known as reconstructionism, emphasizes the role of career and technical education in contributing solutions to problems such as discrimination in hiring, the glass ceiling experienced by women and members of minority groups, poor working conditions, or the lack of viable job advancement opportunities. "The reconstructionist strand of pragmatism is explicit in that one of the purposes of vocational education should be to transform places of work into more democratic learning organizations rather than perpetuating existing workplace practices" (p. 30).

Another issue directly connected to philosophy is the relationship of vocational and academic education. Not only has vocational education struggled with self-definition, but also with determining how it fits with the academic curriculum. Miller and Gregson (1999) instruct us that public education in the United States has been influenced historically by the blending of two primary schools of thought, idealism and realism, into a philosophy labeled *essentialism.* Essentialism is characterized by an emphasis on basic academics (the 3 Rs), respect for the existing power structure, and nurturing of middle-class values (Sarkees-Wircenski & Scott, 1995). Education from an essentialist's perspective includes

> the notion that ideas, concepts, and theory should hold a more dominant place than preparing for a life role as a worker and producer; learning theory reflecting a behavioralistic approach and memorization over building on the individual's personal experiences; and a subject-matter emphasis on the so-called basic skills and preparation for college as compared with

any significant attempt to extend the range of options to be more inclusive of the needs and ultimate goals for all students. (p. 25)

How should the presence of several different philosophies in career and technical education be treated from a conceptual standpoint? I suggest using a three-dimensional triangle to represent the prevailing philosophies, each side representing one of three prominent philosophies found in the field: essentialism, pragmatism, and pragmatism with a reconstructivist strand (see Figure 2).[6]

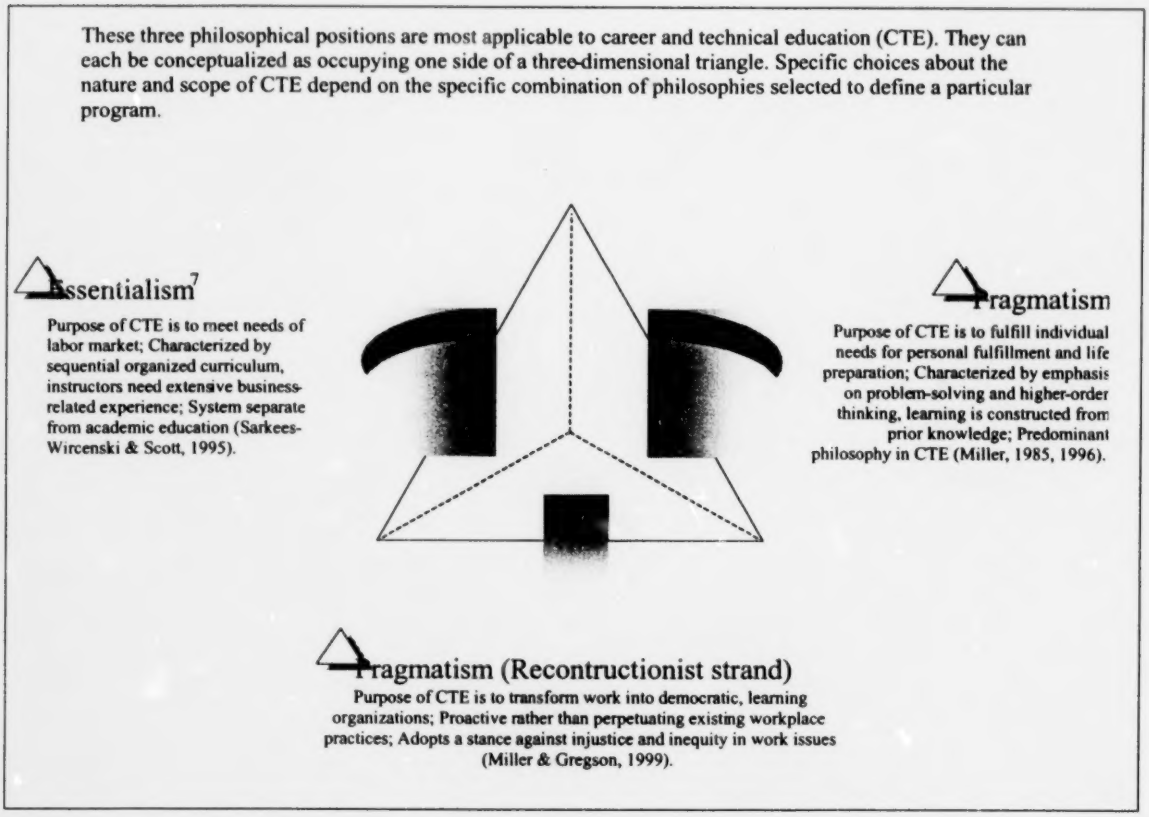
These three philosophical positions are most applicable to career and technical education (CTE). They can each be conceptualized as occupying one side of a three-dimensional triangle. Specific choices about the nature and scope of CTE depend on the specific combination of philosophies selected to define a particular program.
Essentialism[7]
Purpose of CTE is to meet needs of labor market; Characterized by sequential organized curriculum, instructors need extensive business-related experience; System separate from academic education (Sarkees-Wircenski & Scott, 1995).
Pragmatism
Purpose of CTE is to fulfill individual needs for personal fulfillment and life preparation; Characterized by emphasis on problem-solving and higher-order thinking, learning is constructed from prior knowledge; Predominant philosophy in CTE (Miller, 1985, 1996).
Pragmatism (Recontructionist strand)
Purpose of CTE is to transform work into democratic, learning organizations; Proactive rather than perpetuating existing workplace practices; Adopts a stance against injustice and inequity in work issues (Miller & Gregson, 1999).

Figure 2. Alternative philosophies for career and technical education

Philosophy is at the core of any conceptual framework. The specific tenets represented by these three philosophies hold different answers to questions about the ideal nature and scope of the field that, in turn, dictate the types of decisions made on curriculum structure, instructional strategies, program delivery, etc. Identifying three influencing philosophies complicates matters, although the field seems to be converging on the pragmatic (pragmatic combined with reconstructionism) position (Miller & Gregson, 1999).

SECTION III.
IMPACT OF EDUCATIONAL REFORM EFFORTS, 1980S–1990s, ON VOCATIONAL EDUCATION

Since the publication of the report *A Nation at Risk* (National Commission on Excellence in Education, 1983), dozens of public and private studies, commissions, and task forces have convened for the purpose of reforming public education. Underlying most calls for reform is an assumption that the direction of causality for problems found in the economy, labor market, and workplace "runs a complex but direct path—from ineffective schools to increased social problems, loss of international competitive advantage, and high unemployment of youth" (Hartley, Mantle-Bromley, & Cobb, 1996, p. 24). Schied (1999) explained that "recent calls for radical reform of vocational education rest on the spurious notion that the previous decade's economic decline was solely based on a failing educational system, thus, neatly avoiding corporate culpability in the U.S. economic decline" (p. xiii). Readers should interpret reform efforts using this critical perspective, since the influence of external "stakeholders" has had substantial effect on current and projected educational reform efforts. While a review of relevant reports is necessarily limited by the scope of this paper, several of the more prominent and influential efforts—especially those affecting the course of career and technical education—are examined.

First Wave of School Reform

The first wave of educational reforms and initiatives occurred throughout the 1980s in reaction to a growing realization that the United States had lost ground to other industrialized countries in the global economy. Many of these early reform efforts directed focus away from career and technical education, instead pointing to academic education as both problem and solution to educational problems. For example, one of the first, and most influential, educational reform initiatives during this period was produced by the National Commission on Excellence in Education (1983), which published *A Nation at Risk*. The Commission was initially formed to address the failure of students in the U.S. to perform as well as students in other industrialized countries on standardized achievement tests.

This particular report declared imminent danger for the U.S., blaming mediocre and ineffective academic preparation as the underlying problem observed with declining productivity and global economic competitiveness. Early reform efforts, such as *A Nation at Risk*, called for a recommitment to academic basics, with enhanced curricula at all levels consisting of more English, mathematics, science, and technology courses. Five specific areas of reform were targeted: (a) strengthening high school graduation requirements, (b) establishing minimum academic achievement standards, (c) increasing class time on academic basics, (d) improvement of teacher preparation and the education profession, and (e) accountability. Individual states responded by adopting stricter high school graduation requirements, introducing statewide testing, and increasing teacher standards.

Lewis (1998) notes that the line of reasoning used by the National Commission on Excellence in Education (1983) severely challenged "vocational education's main claim to uniqueness in the curriculum" (p. 4). Thus, in the very next year, the National Commission on Secondary Vocational Education (1984) issued their own report, *The Unfinished Agenda*, which

recast the problems with education in liberal terms. The authors of the report emphasized the need to enhance general academic education and personal skills development, rather than specific academic ones. They argued that vocational education could be effective in addressing the problems identified with public education, including "(1) personal skills and attitudes, (2) communication and computational skills and technological literacy, (3) employability skills, (4) broad and specific occupational skills and knowledge, and (5) foundations for career planning and lifelong learning" (p. 5).

Following on the heels of *The Unfinished Agenda,* Parnell (1985) advanced his idea about a new type of technical preparation (*tech prep*) that targeted the middle third of students, those he called the "neglected majority." Basically, tech prep called for an articulated student-centered technical program that included 2 years of high school followed by 2 years of postsecondary education. Including both technical and academic curricula, the tech prep initiative focused much of the educational community's attention on the lack of preparation young people receive to successfully transition from school to adult life. Parnell intended to have the tech prep program replace the general education track in most high schools, and to provide an attractive educational alternative for adolescents.

In the latter half of the 1980s, a report titled *Workforce 2000: Work and Workers for the 21 Century* (Johnston & Packer, 1987) focused attention on the dramatic changes expected in workers (increases in older, minority, and women employees) and work places (from manufacturing to service-oriented jobs) of the 21st century. The report predicted a smaller economy characterized by a slower growing workforce comprised of larger numbers of women, older, disadvantaged, and minority workers. In addition, the authors indicated that only 30% of new jobs would require a 4-year college degree while an additional 22% would require 1 to 3 years of postsecondary education or training. However, they also "projected that the future high-skill service economy would require a high-skilled and productive workforce" (Hogg, 1999, p. 16). As a result, "education beyond high school but less than a baccalaureate degree was expected to be essential to be able to qualify for higher wage jobs" (Hartley et al., 1996, p. 36).

Another report issued around this same time, *The Forgotten Half* (William T. Grant Foundation, 1988), focused on problems experienced by young people as they made the transition from high school to work and adult life. The report concluded that a majority of noncollege-bound youth received minimal assistance for work and adult life, resulting in substantial problems—including the lack of marketable job skills, a prolonged period of floundering in the labor market, poverty, and despair. These problems contributed to increases in single-parent households and unemployment, and decreases in home ownership and jobs offering advancement (Hartley et al., 1996). Noncollege-bound youth—perhaps 50% or more of the students leaving high school each year—were described as *the forgotten half.* Several recommendations were made to remedy the situation, including (a) closer relationships between young people and adults through mentorships, supervised work experiences, and community and neighborhood service projects, (b) expansion of coordinated community-based services and learning experiences such as volunteer work or internships, and (c) improvement of employment and training opportunities and policies for noncollege-bound youth. The Commission believed that job-specific training programs should be replaced with education that linked adolescents to adult life and motivated "students to acquire skills and knowledge they needed for both work and active citizenship" (p. 51).

Second Wave of School Reform

So, the first wave of education reform seen in the 1980s started out with an exclusive focus on academic skills, but gradually recognized that vocational preparation was essential if the U.S. was to be competitive in a technologically-advanced global workplace. Around the start of the 1990s, a second wave of educational reform emerged, even as vocational education was in the midst of redefinition and establishing new directions. This phase of reform emphasized workplace basics, thrust into the spotlight with release of several high-profile reports. Two examples of the reports issued during this second wave of reform include *America's Choice* and the *SCANS Report.*

America's Choice was produced by the National Center on Education and the Economy's Commission on the Skills of the American Workforce (1990) and called for substantial improvement of productivity in the workforce. The Commission warned that the U.S. was headed for a decline in its standard of living if low skills and low-wage jobs were not replaced with high-wage, high-skills employment, and workers who had the skills to fill them. Recommendations proposed by *America's Choice* include (a) new educational performance standards, (b) ensuring that all students attain initial certificates of mastery before graduation, (c) educational alternatives for those who cannot achieve initial mastery status, (d) improvement and expansion of existing community and technical college systems, and (e) creation of oversight boards at national, state, and local levels to administer school-to-work transition programs.

In 1991, the U.S. Department of Labor Secretary's Commission on Achieving Necessary Skills (SCANS) issued a report titled *What Work Requires of Schools: A SCANS Report for America 2000.* This report examined the work skills required to enter and succeed in the workforce of the future, and focuses on the role of schools in preparing adolescents for work (Hogg, 1999). The report concluded that over half of all young people leave high school without the knowledge or foundation required to find and maintain a good job. They recommended a three-part foundation of skills and five competencies considered essential to job performance that all students should possess. The five competencies include (a) identifying, organizing, planning, and allocating personal resources, (b) effective interpersonal relations with others, (c) acquiring and using information, (d) understanding complex system relationships, and (e) selecting, applying, and using a variety of technologies (Frantz, 1997). To attain these SCANS competencies requires a foundation consisting of (a) basic skills in reading, writing, computing, listening, and speaking, (b) thinking skills used in decision-making, creative thinking, solving problems, metacognition, and reasoning, and (c) personal qualities such as individual responsibility, self-esteem, sociability, self-management, and integrity.

Overall, a number of consistent themes emerge from the myriad educational reform reports and initiatives advanced over the past several decades. Prominent themes include the integration of academic and vocational education; emphasis on developing general (transferable) work skills, rather than focusing on narrow, job-specific work skills; articulation between secondary and postsecondary vocational programs (coordinated transition from school to work); adjustments in programs to accommodate changing workforce demographics; preparation for a changing workplace that requires fairly high-level academic skills; familiarity and use of high technology; higher order thinking skills including decision making and problem solving; and interpersonal skills that facilitate working in teams. To this list of prominent themes, Hartley and

colleagues (1996) identified those basic skills deemed necessary to be successful in the modern workplace, and where consensus had emerged in the literature, including "(a) learning to learn; (b) reading, writing, and mathematics; (c) communication; (d) problem solving; (e) personal/career development; (f) interpersonal skills; (g) organizational effectiveness; (h) technology; (i) science; and (j) family" (p. 39). These topics must be acknowledged by and incorporated in any conceptual framework that attempts to reflect contemporary career and technical education.

SECTION IV.
NOTIONS OF THE "NEW ECONOMY"

Since the inception of public career and technical education in the early 1900s, economic developments have had major influences on the content and direction of curricula at secondary and postsecondary levels. Until recently, those developments have been gradual, fairly steady, and, for the most part, predictable. However, over the past decade or so, most economists and labor analysts have identified a *new economy* emerging in the U.S. and around the world (often referred to as *globalization*). While specifics about the new economy are sometimes in dispute, most peoples' (e.g., Carnevale, 1991; d'Orville, 2000; International Labor Organization, 2001; Irons, 1997; Mandel, 2000; Reich, 2000; Shepard, 1997; U.S. Department of Labor, 2000; Weinstein, 1997) understanding of the emerging economy (including expectations for the foreseeable future) includes at least some of the following list of *core* characteristics.

- Manufacturers, spurred by advances in technology, maintain an accelerated level of growth in productivity. To stay viable, businesses are in a continual production mode. However, the emerging system of production is shifting away from high-volume mass production to high-value production, and from standardization to customization. Other market standards are also emerging regarding productivity, quality, variety, customization, convenience, and timeliness.

- The globalization of business markets results in substantial increases in competition for labor and goods. Competition is particularly keen for highly skilled workers, though not exclusively in computer and technology-related areas. The largest labor needs are for persons with innovative and creative methods for (a) producing new products and services, or (b) promoting and marketing these new goods and services to consumers (Friedman, 1999; Reich, 2000).

- Information handling—e.g., storage, transfer, and production—continue to increase in importance in the new economy. Low overhead costs require workers to be able to manipulate data and provide customized, rather than mass-produced, information and services.

- Business management practices are undergoing extensive restructuring and can be characterized by (a) continued downsizing, (b) a premium placed on personnel who can manage knowledge as opposed to people, and (c) an increasing reliance on outsourcing for most work. "Managers will become brokers/facilitators; there will be more technical specialists, more lateral entry, and shorter, flatter career ladders. Instead of the old-style division of labor into discrete tasks, job functions will converge, and work teams will consist of individuals who alternate expert, brokering, and leadership roles. Rewards will be based more on the performance of teams and networks" (Kerka, 1993).

- Fierce competition will affect both for-profit and not-for-profit institutions, resulting in pressure to be innovative and to do it all better, faster, cheaper, and continuously. Restructuring will occur frequently in order to achieve the greatest efficiency and productivity.

What does all of this mean? Hawke (2000) observed that "the very essence of work has undergone a massive transition within the last decade and, for vocational education, this is having major implications" (p. 1). Robert Reich (2000), former U.S. Secretary of Labor, predicted that both work and family life will be affected by changes in the economic structure into the foreseeable future. In terms of work, smaller entrepreneurial groups linked to trusted name brands are likely to be the big winners in the new economy. To remain competitive, these new enterprises (read, "the people comprising these enterprises...") must "continuously cut costs, lease almost everything they need, find the lowest-cost suppliers, push down wages of routine workers, and flatten all hierarchies into fast-changing contractual networks" (p. 6). The decentralization of decision making and reorganization of work structures around semi-autonomous, task-oriented teams will be the norm.

Many of the implicit rules that have governed employment during the latter half of the 20th century—e.g., employees who expect steady work with predictably rising wages, (i.e., full-time, permanent, and for life), a clearly defined employer–worker relationship, and a clear separation between work and family—will no longer be in sync with the emerging reality of work (Hawke, 2000). Instead, Reich (2000) foresees the end of steady work, the necessity of continuous effort regardless of tenure or seniority status, and widening inequality in wages paid to top and lower-level workers. The new economy will require that workers possess a broad set of abilities that include both technical and interpersonal/communication skills. Higher order thinking skills such as decision making and problem solving, as well as flexibility, creative thinking, conflict resolution, managing information and resources, and the capacity for reflection will also be expected from workers of the future (Carnevale, 1991; Secretary's Commission on Achieving Necessary Skills [SCANS], 1991).

Workers will also need to commit to lifelong learning, and organizations will need to provide ongoing retraining for the existing workforce to remain viable in the new economy. The International Labor Organization describes how the new economy is influencing the methods of instructional delivery and types of learning most desirable.

> Wealth creation in the wealthiest countries relies less on physical inputs than on knowledge. The frontiers of knowledge itself, however, are rapidly expanding. Two consequences of this are, first, a shift in teaching methodologies away from the transfer of facts to students as passive recipients, and, instead, towards teaching students how to learn and instilling in them the curiosity to do so. In short, how people learn is becoming as important as what they learn. A parallel trend is observable in high tech firms exposed to fast-paced competition. The ability to learn, to transform existing knowledge into new knowledge, is a source of competitive advantage of increasing significance. (ILO, 2001, Lifelong Learning in Schools, First, and Then at Work section, ¶ 1)

Actual and predicted changes in the economy will influence family and community life in many ways. In fact, Reich (2000) concluded that the "rewards of the new economy are coming at the price of lives that are more frenzied, less secure, more economically divergent, more socially stratified" (p. 8). The high-powered work force of the 21st century requires more and more employees to work late with clientele, be available at all hours, develop contacts and connections, and stay current with new developments. All of these activities take time away from family life—resulting in couples (families) who spend less time together, have fewer children, and

subcontract care and attention for the children they do have. The new economy is also beginning to fragment communities into those groups that have access to education, resources, and the like, and those groups that don't. Reich explains that the growing demand for high-skilled workers is juxtaposed against the pressures of competition pushing the earnings of employees in routine jobs down. Thus, disparities in earnings continue to grow.

Career and technical education stands poised to affect positive change in terms of support, preparation, and guidance in the areas of people's lives likely to be affected by changes in the new economy. Traditionally, the field has maintained emphasis in all aspects of work, family, and community living. However, to be relevant, professionals must critically examine and modernize their underlying assumptions about the world of work and family life, and be willing to reconcile "the way we've always done things" with emerging directions of the economy and needs of the work force as described in this section. To do otherwise, it seems, is to quickly relegate the profession to a footnote in the history of public education in the U.S.

SECTION V.
COMPONENTS OF A CONCEPTUAL FRAMEWORK

What Does a Contemporary Framework Entail?

What should a conceptual framework for career and technical education look like? While few descriptive frameworks have been proposed, several noteworthy exceptions are reviewed here, and form the basis for developing the ideas presented in this section. In fact, much, if not all, of the information needed to develop a coherent perspective of the field—both present and near future—has been addressed and is available through legislation, descriptions of the workplace and work force, research, opinion, and everyday practice. Construction of the framework presented here, then, has capitalized on this information in an effort to synthesize and reflect current streams of thought and practice, rather than devise a *new* vision designed to take career and technical education into the next millennium. In doing so, readers should be able to appreciate current beliefs, purposes, and issues in the field, as well as acquire a sense of the pending issues and concerns in need of resolution (i.e., future directions). The conceptual framework for career and technical education proposed here is offered as a graphic illustration of the relationship of major components that shape the field (see Figure 3). While relationships between various components are given, the major function of the diagram is to serve as a starting point for discussion about the conceptual underpinnings of the field.

Major components of career and technical education are represented by five categories: curriculum, instruction and delivery options, student assessment, clientele, and program evaluation (accountability). Philosophy, whether implicit or explicit, provides the motivation and impetus for actual practice and affects all areas. The influence of internal and external forces on the field—such as the new or emergent economy, educational reform initiatives, student learning, and the expectations of society for career and technical education—are recognized. The remainder of this section is used to examine three supporting areas that delimit the conceptual framework—including general assumptions, past views on the nature and scope of vocational education, and influences on the direction of career and technical education. Section 5 examines each of the major components of the framework in greater detail.

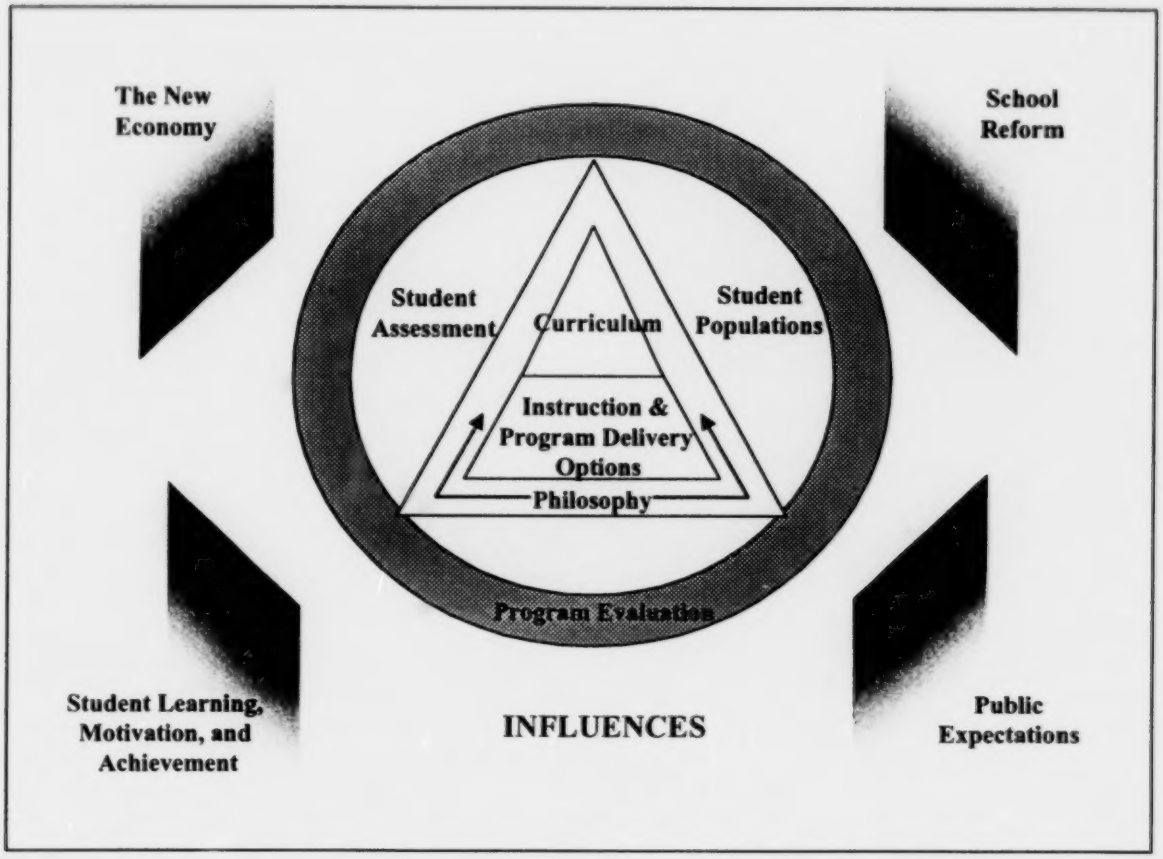

Figure 3. Conceptual framework for career and technical education

General Assumptions

Career and technical educators, as well as others, hold certain beliefs and assumptions about the purpose of the field, the curriculum, and so forth. It is important that these often unstated beliefs be identified, so that confusion or misinterpretation about an articulated conceptual framework is minimized.

To Miller (1985, 1996), philosophy is synonymous with conceptual framework. It is mentioned here to acknowledge the pervasive role of philosophy on both our assumptions about, and implementation of, career and technical education. The assumptions listed here (adapted from several primary sources, including Copa and Plihal [1996], Hoachlander [1998], and Lynch [1996b]), are not exhaustive, but rather serve as examples of the types of assumptions held by career and technical educators.

Assumption 1. The purpose of career and technical education is to enhance the vocational development characteristics of an educated person. Vocational development is a lifelong process of developing the capacity for assuming vocational responsibilities; that is, the expectations for accomplishments in social and economic roles where individuals take responsibility to provide services or produce products of value to themselves and others. Long-term career development should be emphasized, rather than an exclusive focus on entry-level employment.

Assumption 2. Career and technical education must be dynamic, and address the ongoing changes found in workplaces, homes, and communities, to serve the needs of the larger society and interests of individuals it serves. The overarching structure conceives of work broadly and for the long term, encouraging generalization of learning and connections to work-based programs and ideas.

Assumption 3. A knowledge base exists that under-girds all of career and technical education, regardless of occupational specialization. A rigorous, coherent program of academic study exists and can be identified for all programs.

Assumption 4. Changes in career and technical education must be concomitant with reform in academic specializations, and with education reform and renewal in general.

Assumption 5. Strong connections between high school curricula and "the full range of" 2-year and 4-year postsecondary opportunities must be forged.

Assumption 6. Career and technical education should address the long-term needs of successful economic and social development of individuals, and not the narrow, short-term interests of special-interest groups, business, or industry.

Past Conceptual Frameworks

An Emerging Paradigm: Pratzner (1985)

The traditional paradigm of career and technical education has undergone profound changes in recent years that reflect the perceived and actual changes in the nature and scope of work, and the expectations society holds for public education. Pratzner (1985) framed his discussion of the current (and emerging or alternative) paradigm in vocational education around six primary components: subject matter, beliefs in theories and models, values, methods and instruments, exemplars, and social matrices. Pratzner recognized, as have others, the importance of the economic and educational roots of vocational education in serving the labor needs of business and industry. Kincheloe (1999) is critical of these origins, however, stating that "when vocational students learned industrial values such as respect for hard work, submission to authority, the ability to follow orders, and political passivity, the interests of the dominant class were served" (p. 107). Nevertheless, the origins of career and technical education still hold considerable sway over current practice. The traditional paradigm, as Pratzner calls it, reflects an enterprise that serves the interests of employers, provides decontextualized instruction for specialized entry-level jobs, values job placement and earnings, follows a rigid, prescribed curriculum, uses norm-referenced and standardized tests to assess student learning, and has a considerable support network of professional associations and clubs.

Education About Work, Family, and Community: Copa and Plihal (1996)

Copa and Plihal (1996) challenged existing paradigms in vocational education, arguing for substantial change in the structure of career and technical education at both secondary and postsecondary levels. The authors believed that drastic changes occurring in all segments of society necessitated dramatic action. Rather than perpetuate the present form of career and technical education—"a collection of separate fields, each with a unique history and varying interrelationships over time" (p. 97)—they described a *broad field approach* to curriculum integration, where career and technical education is offered to students as a comprehensive subject for learning about work, family, and community roles and responsibilities. A *broad field of study* curriculum for career and technical education teacher education would emphasize the "study of work, family, and community as a composite of vocational roles and responsibilities. ... Next, the course of study could become more specialized as teacher education candidates elect a specialization" (p. 109) and sub-specializations in areas such as (a) human development, (b) the family, (c) technology and technological change, or (d) distribution of power and authority encountered in families, at work, and in the community.

A major advantage of and argument for adopting the approach advanced by Copa and Plihal (1996) is that "the separate fields structure does not respond well to the changing nature of work, family, and community responsibilities. . .[and] more importantly, the separate fields structure fails to recognize the growing importance of the interaction among work, family, and community responsibilities and interests" (p. 103). A major drawback to acceptance of Copa and Phlihal's proposal is that career and technical education would need to be totally reconceptualized, with the likelihood that firmly established (entrenched ?) traditions, organizations, and structures would give way to new ones built on the principles of one broad field of study. While the changes could provide career and technical education with the focus needed to address emerging issues related to work, family, and community, it is doubtful that a wholesale change will occur.

Education Through Occupations: Grubb (1997)

Grubb (1997) advocated a shift from job-specific vocational preparation to a more generic, academic-based approach similar to Dewey's notion of education through occupations. Grubb articulated four general practices that framed his idea of the new vocationalism.

1. The purpose of secondary occupational curricula would be more general in nature, rather than job-specific. This change in emphasis would allow students to pursue several possible career options simultaneously, rather than being required to choose between college or vocational curriculum tracks. "The goals of the new vocationalism include either immediate employment or postsecondary education or a combination of further schooling and employment that has become so common" (p. 78).

2. In terms of curriculum, traditional academic content would be integrated into occupational courses, while occupational applications and examples would be integrated into academic courses.

3. Education through occupations requires a different school (institutional) structure designed to encourage curriculum integration. Grubb (1997) advocated the use of career academies or school-within-a-school designs using career clusters as organizing themes. "Schools adopting clusters (majors or pathways) generally have every student adopt a cluster, usually at the beginning or end of the tenth grade. ... the subjects of these academies or majors are generally clusters of related occupations, or related occupations within an industry, rather than the specific entry-level jobs of conventional vocational education" (p. 79). The advantage of using career clusters for organizing vocational curricula include (a) a more general approach to curriculum design, moving away from job-specific preparation that may become obsolete, (b) inclusion of a greater variety and breadth of academic content in vocational courses, (c) greater appeal to a broad range of students, which facilitates integration by class, race, and gender, (d) the need to provide broad instruction about all aspects of an industry, (e) enhanced career guidance programs that help students make informed choices, and (f) reliance on work-based learning experiences developed through contacts with a broad representation of the local business community.

4. Several other elements of the new vocationalism include (a) the availability of various work-based learning activities such as job shadowing and short-term internships, school-based enterprises, cooperative education, and placements governed by occupational licenses or certificates of mastery, (b) a hierarchical connection of educational and training opportunities both in secondary programs and between secondary and postsecondary programs (i.e., tech prep), and (c) use of applied teaching methods and team-teaching strategies that are more contextualized, more integrated, student-centered, active (or constructivist), and project- or activity-based.

A New Vision: Lynch (2000)

Lynch (2000) describes a "new vision" for career and technical education that supports emerging aspects of the new vocationalism (Gray, 1996; Lewis, 1998). Four major themes are proposed, including to (a) infuse career planning and development activities throughout the education process, (b) embed career and technical education reform within the broad context of general education reform, (c) develop *contemporary* programs based on the needs of business and industry, and (d) institute a K–14 education model where all students are prepared for postsecondary education. Six components are also outlined in Lynch's framework, emphasizing both student achievement and school reorganization. They are to (a) organize programs around major fields of study, (b) use contextual teaching and learning, (c) infuse work-based learning contributing to mastery of industry standards, (d) use authentic assessment, (e) increase the use of career academies, and (f) implement successful models of tech prep. Collectively, the components of this particular conceptual framework for career and technical education are tightly organized around the assumed purpose of career and technical education—to serve the educational and training needs of business and industry.

SECTION VI.
CURRENT (AND FUTURE) STATE OF CAREER AND TECHNICAL EDUCATION

Curriculum

A perennial question for career and technical educators concerns the emphases of secondary and postsecondary programs. Should career and technical education programs (curricula) focus on a particular job or career, career cluster, work in general, or life in general? Indeed, career and technical education has been described as an enterprise in transition. At the start of the 21st century, "the available data signal that change is occurring in the directions advocated by recent reform efforts, in particular, improved academic preparation and greater postsecondary participation" (Levesque et al., 2000). How are these changes being implemented? Curriculum reflects the state of the field—what is considered important, what is being taught (content or conceptual structure), and how it is taught (process; Lewis, 1999). The first two questions are addressed in this section.

Lynch (2000) identifies four predominant schools of thought, each defining the purpose of career and technical education according to the interests of primary stakeholders. These major approaches are detailed in his monograph, *New Directions for High School Career and Technical Education.*

1. Curriculum emphasis is on "*education through occupations*" (see also Grubb, 1997), where career and technical education serves as the instructional (contextual) modality for teaching traditional academic content. "This view, closely aligned with those who advocate the integration of academic and vocational education, seems to be the preferred direction emanating from the scholarly community" (p. 16). Grubb describes four practices typically followed in education through occupations programs: (a) instruction on general occupational competencies, (b) integration of academic and occupational content, (c) development of new institutional strategies to encourage integration, and (d) adoption of other school-to-work program elements (e.g., coordination of work-based and school-based learning through connecting activities, hierarchical sequence of occupational programs, and use of applied teaching methods and team-teaching strategies that are more contextualized, more integrated, student-centered, active (constructivist), and project- or activity-based). Employment through occupations is "predicated on an assumption that in the future, little labor market advantage can be gained from skills training at the high school level because the entry-level credential for high-skill/high-wage work with be a 2-year associate degree in the technologies" (Gray, 1999, p. 164).

2. Focus on providing instruction around broad career clusters, along with specialized skills to the one-third of high school graduates who are *employment-bound* (i.e., have not prepared for, nor entered, postsecondary education immediately upon graduation). The U.S. Department of Education has established 16 broad career clusters reflecting this new direction. "Each cluster consists of all entry-level through professional-level occupations in a broad industry area. Each cluster includes both the academic and technical skills and knowledge needed for further education and careers" (OVAE, 2000, ¶ 1).[8] The best of the historic and successful vocational education programs are retained. This approach appears to be the preferred direction of practitioners in traditional subject areas.

3. Provide career and technical education to the 8–12% of most *educationally disadvantaged* students who need extensive (concentrated) job training to enter the labor market upon high school graduation. "This view of vocational education seems most embraced by many educators of academic subjects, middle- and upper-class parents, and some local policymakers" (p. 17).

4. Organize career and technical programs to be congruent with contemporary and successful *tech prep models* (articulated agreement between a high school and a community or technical college. Provides "non-duplicative, sequenced study that integrates academic with career and technical education, uses work-based and work site learning, and leads to degrees, certificates, and career placement. This direction seems most favored by Congress and by business persons" (p. 17).

A "new vocationalism" has emerged over the past decade, in reaction to myriad reform initiatives and legislation such as the emphasis on school-to-work transition, and reauthorization of federal vocational legislation (i.e., Perkins III). Gray (1996) argues that there have actually been three distinct periods of vocationalism in the U.S. "Vocational education, the first form of vocationalism developed at the turn of the 20th century, has been declining and a new form of vocationalism emphasizing baccalaureate education for everyone has taken its place by default...A third form of vocationalism, typified by *integrated tech prep*, may be emerging" (p. 86).

The new vocationalism is directly focused on skills required to improve the quality of the work force, emphasizing academic and vocational education such as those proposed by the *SCANS Report* (Secretary's Commission on Achieving Necessary Skills, 1991), as well as higher order thinking and interpersonal skills. Discussions surrounding required curriculum components have shifted debate from a narrowly defined set of academic abilities toward a broader set of academic or general competencies, technical and job-specific skills, interpersonal abilities, and behavioral traits, including motivation (NCRVE, 1993). Perkins III places strongest emphasis on three core curriculum issues that are representative of the new vocationalism: (a) *integration* of academic and career and technical education, (b) *articulation* of secondary and postsecondary programs, and (c) *connections* between school and the world of work.

The increasing demands of work for some level of postsecondary education for entry-level jobs poses a substantial challenge to career and technical educators to restructure solidly entrenched curriculum and delivery patterns. During this restructuring, Copa and Plihal (1996) have asked whether career and technical education should remain a collection of discrete fields of study, each with unique history, or be combined to provide one broad field of study on workforce education. The broad field curriculum would involve a synthesis of one or more fields of study into a single branch of knowledge (and learning): "It could be offered to students as a comprehensive subject for learning about work, family, and community roles" (p. 98). The subject matter component of the teacher education program would focus on the study of work, family, and community as a composite of vocational roles and responsibilities.

While the field has not endorsed Copa and Plihal's (1996) proposal regarding a unified curriculum, the result of school reform initiatives, legislation, and the workplace provide the ideal platform to consider moving, at least some, of career and technical education to a common

core called *workforce education.* If the field eventually moves toward workforce education as "the unifying conceptual framework for vocational education [it] will inevitably mean a need to redefine vocational education standards independent of content areas.... It will also necessitate the redefinition of the relationship of vocational education with the rest of schooling" (Hartley et al., 1996, p. 45).

In a 1997 article, Gray discussed the integration of training and development, human resources development, and vocational teacher education at the college level. While different from high school, his comments are applicable to secondary career and technical education. The four areas of commonality Gray identified were (a) a common mission (to improve the occupational status of individual students), (b) common ethical standards (interventions should promote learning, insure safety, uphold public trust, and promote the transition of knowledge to the workplace), (c) a common intervention or core product (work-related instruction), and (d) a common knowledge base (career-relevant academics, and competence in curriculum/instruction design and delivery).

Kincheloe (1999) described a "pedagogy of work" that consisted of a common core of knowledge about the world of work, based on a critical perspective. A pedagogy of work is "the knowledge and values that are produced and transmitted in both schools and the society at large about work [and] are central to workers' ability to make sense of and actively respond to the obstacles they face" (p. 4). Other elements of a common core of knowledge about work might include examination of the social, economic, historical, and philosophical foundations of work such as the nature of work and the economy, the social impact of technology, the power of cultural representations, and the ethics of business and industry.

Educational reform efforts have, undoubtedly, influenced the shape of career and technical education curriculum. While not uniform, the new curriculum is likely to be contextually-based and grounded on the need for students to demonstrate mastery of rigorous industry standards, high academic standards, and related general education knowledge, technology, and general employment competencies (Lynch, 2000). A persistent challenge faced by career and technical educators

> revolves around the question of whether programs should be occupation specific, stressing depth of preparation, or have a broad-based or occupational cluster orientation that stresses breadth of preparation. In this regard, both ETO [employment through occupations] and traditional/tech prep advocates agree that the objective should be breadth not depth. (Gray, 1999, p. 165)

A number of implications exist for structuring (or restructuring) career and technical education teacher preparation programs. Perhaps a starting point for discussion about teacher preparation is to acknowledge that there is "some knowledge that is unique to vocational teacher education" (Griggs & Burnham, 1988, p. 78). But, what is that knowledge? As a result of the numerous educational reform initiatives and reports, as well as changes in school-based practice, Lynch (1996a) offered 10 principles covering faculty, programs, and resources that can serve as a foundation for developing career and technical education teacher preparation programs, curriculums, clinical experiences, standards, measures, and practices that will assure high-quality graduates.

Faculty...

- are committed to their students and to students' professional development as lifelong learners,
- use curriculum and instructional techniques to integrate theory with practice, academic and workforce education, professional education and subject matter, learning theory, and workforce preparation,
- understand the philosophy, contemporary concepts, research, effective practice, and methods of inquiry related to workforce preparation and development,
- use dynamic pedagogy, based on learning theory and practices, and are partners in learning communities, through which they model collaboration and democratic processes.

Programs...

- are dynamic and change-oriented,
- are grounded in academics, workplace subject matter, technology, professional education, and clinical experience, and
- reflect cultural diversity.

Colleges and universities...

- provide adequate resources to sustain programs at high quality levels, and
- provide a clearly identified group of academic and clinical faculty for whom vocational and technical education preparation is a top priority.

Lynch (1997) also described the type of content that should be included in a curriculum designed to prepare career and technical educators. Ideally, a teacher preparation curriculum in career and technical education would address the following components:

1. Assessment
2. Curriculum framework
   a. General education
   b. Common core, specialized workforce education, and workforce preparation processes
   c. Knowledge of the learner, pedagogy, instructional technology, and professional education

d. Occupational and educational clinical experiences

3. Standards of knowledge and practice

4. Principles of career and technical education

5. Philosophical foundations (i.e., pragmatism, progressivism, and constructivism)

Frantz (1997) reported on results he obtained from a study sponsored by the University Council for Vocational Education (UCVE). The study used a nominal group technique involving representatives of the 21 member institutions to identify significant trends and issues of national importance for workforce preparation, and to determine their implications for vocational teacher preparation. The six highest rated implications for teacher preparation included:

1. The need for a broad-based philosophical understanding of the purpose of education and the role of vocational education in the restructuring and improvement of workforce preparation.

2. Programs that are structured to optimize the subject matter relationships and the collaboration needed between academic and vocational education.

3. A common knowledge base that provides philosophical, sociological, economic, and psychological foundations.

4. Incorporation of technological and organizational practices of the workplace, as well as current pedagogical concepts and practices.

5. Preparing vocational educators for new leadership roles requiring skills in working with community-based, school, and political groups.

6. An emphasis on contextual learning strategies as a means for linking education and the workplace.

Career and technical teacher education programs should be guided by the overall mission(s) and standards established by the field (see Table 1). Ideally, emerging teachers will be highly qualified—"caring, knowledgeable, comfortable with constructivist approaches, who teach to high standards and help students achieve them, and adjust instruction to learning styles of students" (Lynch, 2000, p. 39).

Table 1.
Issues to Consider when Developing the Curriculum Component of a Conceptual Framework in Career and Technical Education (CTE)

Four schools of thought on secondary CTE curriculum[a]	Employment through occupation	CTE is modality for teaching traditional academic content; integration of academic and vocational education
	Employment-bound	Instruction on broad career clusters, along with specialized skills
	Educationally disadvantaged	Extensive job training to enter labor market upon graduation
	Tech prep models	Non-duplicative, sequenced, and articulated secondary and postsecondary programs integrating academic with career and technical education
Components of *secondary* CTE curriculum	Common core (Workforce education)	Study of work, family, and community as a composite of vocational roles and responsibilities
	Job-specific/content area specialties	Focused on traditional vocational subject areas
	New vocationalism	Broad array of integrated academic (i.e., thinking skills, and personal qualities) and general (*SCANS*) competencies, technical and job specific skills, interpersonal abilities, and behavioral traits, including motivation
Implications for CTE teacher preparation programs	Curriculum components	Assessment Curriculum framework (general education, common core and specialized workforce education, and workforce preparation processes; knowledge of the learner, pedagogy, instructional technology, and professional education; and occupational and educational clinical experiences) Standards of knowledge and practice Principles of career and technical education Philosophical foundations

[a]The major issues used here are adapted from Lynch (2000).

According to Gregson (1993), the best way to accomplish this is to replace traditional master–apprentice models with a critically-oriented approach where students are viewed as active learning partners, to implement cooperative learning and choice, to make learning experiences relevant and meaningful, to encourage active citizenship, and to create an environment that encourages reflective thinking. Ultimately, the end products of career and technical teacher preparation, as well as secondary and postsecondary programs, should reflect the philosophy that undergirds the field—namely, pragmatism.

> Accordingly, an educational system based on philosophic pragmatism would result in learners who are problem solvers, lifelong learners, makers of meaning, collaborators, change agents who are also able to change, and practitioners of democratic processes. Education based on this philosophy should be measured against these outcomes. (Miller, 1996, p. 70)

Instruction/Delivery Options

Biggs, Hinton, and Duncan (1996) asserted that major changes in the educational infrastructure are necessary to support and build a quality work-preparation system for the 21st century. And, a number of contemporary teaching innovations have emerged or assumed a greater role in career and technical education including tech prep, integrated curriculum, cognitive- and work-based apprenticeship, career academies, school-based enterprises, and cooperative education. Table 2 provides a summary of these selected approaches to teaching and learning. Each approach requires new methods of pedagogy to accommodate teachers' emerging roles as collaborators, facilitators of learning, and as lifelong learners; familiarity with the workplace; and ability to make school settings reflect workplace environments (Cotton, 2001; Naylor, 1997). The presence of these innovative practices requires career and technical teacher educators to incorporate relevant aspects of these new practices in their preservice and in-service programs. Each of these six innovations is examined briefly in the next several paragraphs.

Tech Prep

Technical preparation programs (commonly referred to as "tech prep" or "2+2") have become a central feature of new curricular models in career and technical education (Bragg, 1999). Tech prep represents programs that offer a coordinated curriculum articulating the last 2 years of study at the secondary level with 2 years of postsecondary education or training (e.g., apprenticeship).[9] The curriculum must include a common core of mathematics, science, communication, and technologies designed to lead to either an associate degree or skills certificate. Two features—integration of academic and vocational education, and articulation between secondary and postsecondary programs—are key aspects of tech prep. Biggs and colleagues (1996) summarized the intent of tech prep programming:

> The secondary-level tech prep program runs parallel to, but does not replace, the secondary-level college preparatory degree. Tech prep combines a common core of learning and technical education; rests on the foundation of basic proficiency in math, science, communications, and technology; presents content in applied settings; consists of a structured and closely coordinated curriculum; and builds on career clusters of technical systems. (p. 121)

Table 2.
Contemporary Approaches to Teaching and Learning in Career and Technical Education

Approach	Characteristics	Strengths	Challenges
Tech prep	•Articulation agreement(s) between secondary and postsecondary institutions •"2+2" design (2 yrs secondary plus 2 yrs postsecondary leading to associate degree or certificate in specific career) •Common academic core: math, science, communications, technology	•Combines academic rigor and applied instruction •Option to continue to baccalaureate level ("2+2+2" design) •Appropriate for nearly all career areas	•Resistance to career-oriented concepts •Securing support from stakeholders •Limited resources (funding) •Uncertainty of postsecondary level curriculum reform •Need for teacher training •Addition of work-based learning •Assessment of programs and students
Integrated vocational and academic education	•Modifications of academic and vocational philosophies •Applied focus in learning activities •Balances theory with application •Coordination between teachers and counselors	•Uses CTE settings to apply and reinforce academics •Life-relevant education •Didactic instruction replaced with activity-centered instruction and problem-solving •Appropriate for all students	•Requires organizational change in schools •Requires interdepartmental cooperation and collaboration •Design and implementation takes time •Need for assessing benefits for all students •Need for administrative and community support
Career academies	•School-within-a-school run by team of educators •Career field focus rather than specific job preparation •Integrated academic and vocational content •Includes necessary workplace skills •Employer involvement	•Career focus may keep high-risk students in school	•Scheduling conflicts • Requires involvement of business and industry •Requires collaboration and cooperation between academics and career-technical educators and limited instructional resources
Work-based youth apprenticeship	•Work experience and learning in industry •Linkage between secondary and postsecondary education leading to high school diploma and/or post-secondary diploma or certificate •Collaboration among groups •Modeling, scaffolding, fading, coaching	•Creates a learning situation that emphasizes the skills and knowledge required by the workplace	•Requires significant employer participation, workplaces are transformed •Potential conflict between employers' and students' needs •Requires collaboration and cooperation between schools and employers
Cooperative education	•Operated by traditional CTE programs •Written training agreements specify what students will learn and employer's responsibilities	•Students obtain part-time jobs •Work-based learning •Use as a screening device by employers for new employees	•Lack of coordination between students' school and work experiences is common •Use as a screening device by employers for new employees
School-based enterprises	•Students produce goods or services for sale to customers	•Students apply academic knowledge to work and gain understanding of business •Instructors maintain control of instructional activity	•Focus can shift to production rather than instruction •Lack of understanding about how learning occurs in the workplace

Sources. Table structure and some content from Biggs et al. (1996). Additional content from Kincheloe (1999).

Bragg (1995), arguably one of the foremost authorities on tech prep, identified six core concepts that form the basis for quality tech prep programs:

1. Tech prep must be grounded in an integrated and authentic core curriculum.
2. Formal articulation must occur between secondary and postsecondary levels.
3. Work-based learning experiences should be integrated.
4. Tech prep should be developed as a standards-driven, performance-based initiative.
5. Tech prep should be accessible to all students.
6. Joint planning, development, and implementation between all stakeholders are critical for success.

Gray (1999) pointed out that in some states, regional vocational schools have moved past established 2+2 tech prep programs to innovative "1+1" systems. "In such a system the first year of a technical education associate degree is actually offered in the senior year of high school vocational education" (p. 166). Gray predicts that traditional, employment-based secondary vocational education may persist, but in the future most programs will have some type of tech prep component.

The emergence of tech prep programs has not been without difficulties (Bragg, Kirby, Puckett, Trinkle, & Watkins, 1994). Silverberg and Hershey (1995) described four common obstacles encountered when developing or maintaining tech prep programs: (a) insufficient funding and resources, (b) negative attitudes toward vocational education, (c) a lack of integrated curriculum, and (d) problems with class scheduling. While encountered at both secondary and postsecondary levels, the authors found the greatest barriers to tech prep at the secondary level.

Another potential barrier to implementing successful tech prep programs is a lack of appropriate curriculum content in undergraduate teacher preparation programs to address the unique and innovative elements of tech prep. Roegge, Wentling, and Bragg (1997) conducted a four-phase study designed to determine the knowledge and skills needed by career and technical educators when implementing tech prep programs at the secondary level. They identified five major themes of tech prep delivery and the potential implications for teacher preparation:

1. Major Theme: Teaching and learning through application
   Implications: (a) Teachers must be able to apply their subject matter specialty in real-world contexts.
   (b) Pre-service teachers need more opportunities to apply pedagogical skills before first teaching job.

2. Major Theme: Student-centered/Inquiry-based instruction
   Implications: (a) Prospective teachers need to know how to use a student-centered approach.
   (b) Teachers must be willing to relinquish some control of learning situations.

3. Major Theme: Integration of academic and vocational education
   Implications: (a) Significant portion of teacher preparation should be devoted to integration.
   (b) Preparation should address policy issues, certification, and admissions standards.

4. Major Theme: Collaboration
   Implication: (a) Teacher educators should show how specialty areas connect and contribute to overall educational mission.

5. Major Theme: Real-world experience
   Implication: (a) Teachers need to gain work-related experiences (e.g., summer workplace requirements).

Integrated Vocational and Academic Curriculum

The integration of academic (theory) and vocational education (practice) into a single curriculum is a critical component of reform efforts in career and technical education (Lynch, Smith, & Rojewski, 1994). Ramsey, Bodilly, Stasz, and Eden (1994) assert that "the core of the integration concept is to combine the best curriculum and pedagogical practices of academic and vocational education into a single, integrated program that is available to all high school students." They identified four common themes that characterize the integration of academic and vocational education:

1. Richer, better-sequenced curricula.
2. Facilitative instruction to motivate learners, and provide practical and applied understanding of the world.
3. Increased collaboration and coordination among academic and vocational teachers.
4. Focus on skills and knowledge needed to help adolescents and young adults transition from school to work and postsecondary education.

Usually, "academics are taught via applied learning activities that incorporate relevant real-world and workplace problem-solving into the curriculum" (Biggs et al., 1996, p. 123). Academic principles are taught in the context of real-life situations that are directly applicable to work, family, and community. Delivery of integrated curriculum can occur in a number of ways—including team teaching, reorganization of departments by occupational clusters, reorganization of faculty, teacher collaboration, or developing career paths or occupational majors. Integrated programs are designed to eliminate educational tracking and replace teacher-centered basic skills instruction with student-centered problem-solving activities (Berryman, Flaxman, & Inger, 1993; Grubb, Davis, Lum, Plihal, & Morgaine, 1991).

One area where applied academics instruction appears particularly well-suited is in work-based settings. Work-based learning uses environments outside of school to assist students in connecting school-based learning with real-life work activities. For Moore (1999), a crucial issue for evaluating the experiences of students in work-based learning programs is not what knowledge is in the environment, but how students encounter various kinds of knowledge as they participate in workplace activities. Hughes, Moore, and Bailey (1999) identified the five primary reasons that work-based learning programs are implemented, including (a) acquiring knowledge or skills related to employment in particular occupations or industries, (b) providing career exploration and planning, (c) learning all aspects of an industry, (d) increasing personal and social competence related to work in general, and (e) enhancing students' motivation and academic achievement.

The variety of experiences available under the guise of work-based learning can be placed on a continuum ranging from structured work-life experience, paid work, and apprenticeship programs to cooperative education, mentoring, and internship experiences (Smith & Rojewski, 1993). Eight specific types of work-based learning activities have been identified—including field trips, job shadowing, service learning and unpaid internships, school-sponsored enterprises, employment, subsidized employment training, cooperative education and paid internships, and apprenticeships (Hamilton & Hamilton, 1997).

While proponents claim that work-based learning improves students' academic performance, Hughes et al. (1999) did not find evidence to support the claim. However, they suggested that "other, non-academic but equally important forms of learning can come from work experience and that these forms give us good grounds for supporting work-based learning."

Increased use of work-based learning approaches will require that teacher education programs provide students with exposure to and comfort with a variety of relevant topics. Lynch (2000) explains:

> Contemporary work-based learning is grounded in teaching and learning research emanating from the cognitive sciences, psychology, and pedagogy. Consistent with research from these various disciplines, work-based learning blends into an integrated curriculum the mental and tactile, theoretical and applied, and academic and vocational. This blending appears to result—for most students most of the time—in increased retention of knowledge, deeper understanding of subject matter, and the ability to apply (i.e., transfer) knowledge and skills in well-structured environments. The effectiveness of blended classroom and work-based activities also draws strength from the psychological and pedagogical principles underlying constructivism, contextual learning, and the teaching of concepts and subjects through a variety of methods based on students' preferred learning styles and authentic assessment. (p. 67)

Each of the topics identified by Lynch should be considered when reviewing career and technical education teacher preparation curriculum. Biggs et al. (1996) note that an integrated hands-on approach to curriculum development and instruction can only be achieved through an extensive orientation to the philosophy and goals of applied academics for both academic and career and technical educators. These issues must also be incorporated in preservice education programs for both academic and career and technical educators.

Career Academies

Career academies are secondary programs designed to work with a relatively small number of students (up to approximately 50 students per grade level) over the course of 2–3 years. Academic and career-technical educators work collaboratively with the same student cohort for several years, focusing on the integration of academic and work-related skills that are usually connected to a particular career cluster or industry—such as environmental technology, applied electrical science, horticulture, aviation technology, health care careers, business education, and computer engineering. Rather than providing limited job-specific work skills, however, graduates from career academies should be academically and technically proficient and qualified to continue with postsecondary education or to enter the labor market. Career academies exist in many forms (some follow an academy model, while others are implemented school-wide), and are known by a variety of different terms. Despite such diversity, the following characteristics are shared by most career academies (Berryman et al., 1993; Lynch, 2000; Maxwell & Rubin, 2001; U.S. Department of Education, 1999):

1. Clusters of students who share many of the same classes each day (block scheduling) and have some of the same teachers from one year to the next.

2. Academic courses that meet high school graduation and college entrance requirements. The existence of a sufficient number of career and technical courses to comprise a career major. Common planning periods for teachers to integrate academic and vocational content.

3. Strong partnerships with local business and industry and mentoring programs.

4. Work-based learning experiences (and other structured out-of school learning experiences) built into the curriculum.

5. A group of business people who advise school district on important components of the program.

After examining available data on career academies, Stern, Dayton, and Raby (1998) concluded that students in secondary-based career academies were more academically successful than those who had not participated. However, they also concluded, "There is little evidence that career academies give their graduates any immediate advantage in the labor market. In other words, entry-level job training is not what career academies seem to be delivering. Instead, they appear to be helping students strengthen their academic performance, which may improve their career options some years later" (p. 18).

Work-based Youth Apprenticeship

Historically, the term *apprenticeship* has involved "learning by doing" under the guidance of a mentor or master craftsperson (Smith & Rojewski, 1993). Bailey and Merritt (1993) note that school-based apprenticeship programs are not merely extensions of this classic view. Rather, contemporary apprenticeships in the U.S. are calling for the transformation of workplaces into integral parts of the basic education system, and are being designed to coordinate structured school-based learning with supervised work experience—usually in an identified broad career

cluster such as health occupations or office technology. While no single work-based apprenticeship model exists, four basic components are widely recognized as being characteristic of bona fide programs:

1. *Target population.* Apprenticeship programs are designed to be integral parts of the basic education of a broad cross-section of students. They are for specific occupations or specific target groups.

2. *Educational content.* Educational content consists of integrated academic and vocational instruction, and is designed to teach broad employability skills.

3. *Location of instruction.* A significant part of an apprentice's education takes place on the job, and is coordinated with (and complemented by) classroom instruction.

4. *Credentials.* Students emerge from apprenticeships with recognized and accepted credentials that certify achievement for specified levels of skills (Bailey, 1993; Bailey & Merritt, 1993; Berryman et al., 1993).

Berryman et al. (1993) asserted that apprenticeship programs must nurture a sense of employer involvement and ownership, as well as ensure that skills standards and credentials are rigorous, if these types of programs are to become more widespread. If youth apprenticeship programs are to become more common, problems such as lack of employer participation, inconsistent quality (and understanding) of on-the-job pedagogy (i.e., work-based learning), and attending to issues of inequity and nonaccessibility must be adequately addressed (Bailey, 1993; Bailey & Merritt, 1993).

The emergence of work-based apprenticeships poses certain challenges to the next generation of career and technical educators, as well as to teacher educators. Particularly with programs such as apprenticeships, teacher educators must provide pre-service teachers with a sound notion of the technical and organizational practices of the workplace, understanding and extensive practice with contextual teaching and learning strategies to link education and work, and an ability to collaborate with a variety of professionals from both education and work communities (Frantz, 1997).

Cooperative Education

Cooperative education has long been used by career and technical educators as a means of connecting part-time jobs with classroom knowledge. Typically, co-op programs combine paid, supervised, and credit-bearing work with a secondary academic program integrated with non-cooperative education students. Participants enter into written training agreements with their employers, specifying the types of job tasks to be performed and the responsibilities of employer and school coordinator. The general goal of cooperative education is "to provide students with opportunities to alternate academic studies with relevant work experiences, allowing them to apply what they have learned in the classroom to the job" (Stone & Wosner, 1990, p. 27). While similar to other work-based options, Berryman et al. (1993) observed that

> this one is less formal, less standardized, and has fewer well-defined elements. Students usually spend the morning in school classes recommended and approved by the school co-op coordinator, and the last half of their day working in a paid job for which they receive high school credit. (The Options section, ¶ 14)

Cooperative education appears to present a number of positive benefits to participants. Specifically, students enrolled in these programs are usually involved in a variety of job duties (related to school learning—e.g., reading, writing, problem-solving) requiring varying degrees of responsibility leading to increased academic achievement, enhanced cognitive development, and successful transitions from school to work. Stone, Stern, Hopkins, and McMillion (1990) compared students in unsupervised employment with students in school-supervised work programs, and found students in supervised programs had higher quality jobs that offered greater contact with adults. Additionally, co-op programs took advantage of outside facilities that could not be easily duplicated in school, provide immediate feedback regarding program involvement, and contribute to higher student retention rates (Smith & Rojewski, 1993).

Despite these advantages, co-op programs continue to encounter barriers to their widespread use as a means of preparing adolescents for the transition from school to adult life. For example, the low status of cooperative programs is a substantial problem of long standing. Programs are often viewed as "a dumping ground for low-achieving, low-income, minority students" (Ascher, 1994). Kincheloe (1999) cited a lack of coordination between school representatives and employers as a major problem of cooperative education. Other problem areas include the expenses required to promote and maintain a quality co-op program, a lack of understanding about the learning that occurs in workplaces and how to maximize it, and lack of a standardized way to recognize skill attainment (i.e., certification; Ascher).

In the majority of high school cooperative education programs, a teacher/coordinator handles all work placements and teaches a course related to students' work assignments. While most undergraduate career and technical teacher preparation programs have traditionally offered a course on the mechanics and structure of co-op education, many of these courses have disappeared. Whether resurrected in traditional preservice programs or offered as in-service training, courses or programs should provide information about methods of developing curriculum, identifying materials and students, contacting and maintaining business and industry relationships, designing individual job-training agreements, and so forth (Ascher, 1994).

School-based Enterprises

School-based enterprises engage students in activities that provide services or produce goods for people other than participating students. Some school-based enterprises may result from partnerships with local businesses, while others may come from instructional programs and teachers. Examples include school stores, school restaurants, construction projects, print shops, farms, child care centers, retail and auto repair shops, and production of school newspapers and yearbooks (U.S. Department of Education, 1991). These types of experiences provide students with opportunities to apply academic knowledge to work, and to gain hands-on experience (and understanding) of business operations (Kincheloe, 1999). Many school-based enterprises incorporate the theme of entrepreneurship into associated curriculum. Berryman et al. (1993)

argue that while highly motivating and an efficient way to develop knowledge and skill, school-based enterprises are not designed as a formal part of a work preparation system.

Student Assessment

The emphasis of many educational reform initiatives on higher order thinking skills—such as problem-solving, critical thinking, reasoning, and so forth—and expressed dissatisfaction with conventional testing approaches demand that different approaches to assessing student learning be implemented (Johnson & Wentling, 1996).[10] Most educators refer to this new form of student evaluation as authentic, or performance-based, assessment. Authentic assessment has three fundamental goals: reforming curriculum and instruction, improving teacher morale and performance, and strengthening student commitment and capacity for self-monitoring (Inger, 1993).

At its core, authentic assessment is a reaction to the deficiencies perceived in traditional approaches to testing. It requires students to demonstrate their grasp of knowledge and skills by creating a response to questions or a product that demonstrates understanding (Wiggins, 1989, 1990). This type of assessment reflects the complexities of everyday life and a belief that learning is actively constructed knowledge influenced by context (Kerka, 1995). Authentic assessment focuses on the broad knowledge and skills that individuals need to solve real-world problems (see Table 3).

A variety of options are available to students and instructors who choose to use authentic assessments—including portfolios and exhibitions, checklists, simulations, essays and other writing samples, demonstrations or performances, interviews, oral presentations, observations by instructors and peers, and self-assessment. Rubrics (scoring devices that specify performance expectations and the various levels of performance) are used to establish benchmarks for documenting progress, and provide a framework for ensuring consistency (Kerka, 1995).

The topic of authentic assessment should be addressed in career and technical education teacher preparation programs both as a means to evaluate program performance and as part of the teacher preparation curriculum. Johnson and Wentling (1996) delineated four emerging trends in assessment that must be adopted by teacher educators. First, programs must change from a culture of testing to a culture of assessment. This is accomplished by viewing assessment as an opportunity for learning; relying on criteria-based standards; viewing evaluation as a constructive process verified by application, use, and transfer of knowledge in real contexts; and valuing the process of performance as well as the correctness of responses. Second, multiple types of assessments must be used in an ongoing process of student evaluation. Third, teaching portfolios need to be used to document teaching capabilities.

> A teaching portfolio is not a comprehensive record of teaching performance over time; rather, it is a selective sampling of the best work that illustrates one's personal distinctive teaching style. ... The main body of a teaching portfolio contains actual work samples generated by the individual and can be organized around the four core tasks that confront every teacher: course planning and preparation, actual teaching, evaluating student learning and providing feedback, and professional development (p. 161).

Finally, assessment centers should be established to facilitate the process of teacher assessment. The belief is that a "comprehensive portrait of a candidate's skills and aptitudes, viewed by an unbiased party, will provide a valuable perspective to the assessment process" (p. 163).

Table 3.
Comparison of Authentic and Traditional Student Assessment Characteristics

Authentic assessment	Traditional assessment
1. Directly examine student performance	1. Infers actual performance based on proxy items thought to be valid representations of performance
2. Requires students to be effective performers with acquired knowledge	2. Requires students to recognize or recall information learned out of context
3. Presents a full array of assessment options guided by priorities and challenges found in instructional activities.	3. Usually limited to paper-pencil, one-answer questions.
4. Assesses student ability to craft thorough and justifiable answers, performances, or products.	4. Ask students to select or write correct answers, irrespective of reason.
5. Validity and reliability are achieved by emphasizing and standardizing appropriate real-world criteria for scoring.	5. Standardizes objective test items.
6. Test validity depends, in part, on how well the test simulates "real-world" tests of ability.	6. Validity on multiple-choice tests depend on matching items to curriculum content or statistical analysis.
7. Involves ill-structured challenges and roles to help student rehearse for complex ambiguities of life.	7. Resembles drill, assessing static and too-often arbitrary, discrete, or simplistic elements.

Note. Information taken from Wiggins (1990).

Clientele

No matter how you cut it, vocational education has always involved students marginalized around the intersecting axes of race, class, and gender. (Kincheloe, 1999, p. 217)

The conceptual underpinnings to career and technical education should provide some sort of base for addressing two concerns—namely, "What does career and technical education stands for?" and "How do career and technical educators accomplish their mission?" As illustrated throughout this paper, these matters are extremely complex and defy easy answers. Nowhere is this more true than when the appropriate clientele for career and technical education programs is considered. While the historic roots for vocational education were in providing job-specific training to working-class (noncollege-bound) youth, the contemporary world of work requires few of the manual job skills required a century ago. Today, ample evidence has accumulated (see Section 3) that shows the work skills required in the 21st century include higher order thinking skills (reasoning, decisionmaking, problem solving), flexibility, interpersonal skills, and technological literacy. Not only are cognitive skills in demand, but many jobs now require some type of postsecondary education (less than a baccalaureate degree) for entry level.[11]

Work-bound or College-bound Yuth

Has the clientele for career and technical education shifted away from work-bound youth to those adolescents who don't attend a 4-year college or university, but receive some type of postsecondary education at a technical or community college? Should secondary career and technical education be charged with providing job-specific training to students not attending some form of postsecondary education? At present, few answers exist.[12] Answers are needed, however—especially when considering the implications for noncollege-bound youth enrolled in career and technical education programs.

Due, in part, to recent national initiatives such as the School to Work Opportunities Act of 1994, increased attention has focused on work-bound youth. Over a decade ago, the seminal report by the William T. Grant Foundation (1988) Commission on Work, Family, and Citizenship, *The Forgotten Half*, critically examined the declining fortunes of American youth who did not receive a college education. In a 2-year study of 16–24-year-olds, the report concluded that noncollege-bound adolescents were likely to enter adulthood "in the economic limbo of unemployment, part-time jobs, and poverty wages" (p. 1). A recent follow-up to this report, *The Forgotten Half Revisited* (Halperin, 1998), noted that despite a booming U.S. economy, prospects for work-bound youth have actually worsened in the past decade in a number of key areas—including fewer available jobs offering stability and advancement, high unemployment, decreased wages for young adults, and little or no public assistance in helping adolescents with the transition from school to adult life. Indeed, many work-bound youth initiate their transition from school to work without a systematic plan of action or help and support from schools or employers—often resulting in a prolonged period of "floundering, trial and error, lingering unemployment, and general despair" (Herr & Niles, 1997, p. 149). This bleak prospect has been fueled by a sense that American work-bound youth are undereducated, receive little or no career guidance, and lack the requisite skills needed to enter a high-skilled, high-tech work force (Herr, 1996; Smith & Rojewski, 1993; Worthington & Juntunen, 1997).

Currently, career and technical education programs serve several primary functions ranging from integrated academics instruction to tech prep to job preparation for employment-bound and educationally disadvantaged youth. These diverse goals aim to achieve very different ends, and are often at-odds with one another. Lynch (2000) suggests that almost one-third of all secondary students enrolled in career and technical education programs are not college-bound. Another

8–12% of students are identified as being educationally disadvantaged. Both of these groups require job-specific preparation to transition from school to adult life. However, recent trends to promote articulated secondary–postsecondary programs may overlook this substantial proportion of program enrollees. And, when services are available, they are often relatively low, entry-level job skills that offer limited job entry or advancement opportunities.

Special Populations[13]

Historically, at least in the last 20 years or so, career and technical education has served a significant role in addressing the work-related needs and concerns of typically underserved groups—including individuals who were work-bound, disabled, and disadvantaged. However, it appears that much of the field has changed in attitude and position about serving students with special needs. Part of the thinking that contributed to the passage of the 1917 Smith-Hughes Act was an emphasis on serving a growing body of children from working-class families (Gray, 1999). Gordon (1999) writes that both Snedden and Prosser, whose ideas formed the basis for the 1917 Smith-Hughes Act, saw vocational education as a means of meeting labor-force needs and preparing students with limited intellectual ability for immediate employment in industry. However, the Federal Board for Vocational Education, established by the Smith-Hughes Act to oversee the expenditure of federal funds, made its position clear in its first policy bulletin describing those to be served in the newly formed enterprise called vocational education:

> The Federal Board desires to emphasize the fact that vocational schools and classes are not fostered under the Smith-Hughes Act for the purpose of giving instruction to the backward, deficient, and incorrigible or otherwise subnormal individuals; but that such schools and classes are to be established and maintained for the clearly avowed purpose of giving thorough vocational instruction to healthy, normal individuals to the end that they might be prepared for profitable and efficient employment. (cited in Meers, 1987, p. 13)

The Federal Board policy reflects a different time and place, although current disagreements over the role of career and technical education in serving special populations still exist.

In many ways, vocational education during the 1960s, '70s, and '80s was a leader in providing integrated (and segregated) education to special populations. The Vocational Education Act of 1963 was one of the first pieces of federal legislation to address the educational needs of special populations, although it was not until the 1968 Amendments to the Act that federal funds were specifically earmarked for serving students with special needs. The 1984 Carl D. Perkins Vocational Education Act actually set aside half of all federal funds allocated for vocational programs (51% of all federal funds were set aside and, thus, restricted), and required strong assurances that programs served special populations. Reacting to opposition to set-asides voiced by administrators based on the restrictive nature of federal set-asides, the reauthorization of the 1984 Act in 1990 (*Perkins II*) eliminated specific set-asides for special populations. However, the 1990 amendments did maintain strong language and required states to provide assurances that students with special needs had equal access to vocational programs.

Shortly after the 1990 reauthorization, Congressional leaders and some education groups (including vocational educators) began to express concerns about the attention being devoted to special populations. Critics contended that too much federal funding was focused on a narrow

segment of the student population, that dumping unqualified students with special needs into vocational classes because of poor academic skills was rampant, and that increased demands to serve ever more students with special learning needs were being heaped on the profession. Concerns were also expressed that the competing demands of the 1990 Act, which called for improving program image and skill standards while simultaneously serving increasing numbers of hard-to-serve students with special needs, would result in a no-win situation for vocational educators (Fjellheim, 2000; National Assessment of Vocational Education [NAVE], 1994). As a result, the 1998 reauthorization (*Perkins III*) provides great flexibility at the local level, and has decreased emphasis on serving special populations (Kochhar, 1998).

A number of unanswered questions remain for the field to tackle as ongoing reform efforts of career and technical education curriculum occur, including: How will current and future reform initiatives and subsequent changes to career and technical education programs affect students with special needs?

How do higher academic standards and the increasing need to attend some type of postsecondary education affect special populations and work-bound youth? Should there be a high school career and technical education option that focuses solely on job-specific training? If so, can a program based at the secondary level provide high-skills/high-wage jobs?

Program Evaluation

Accountability has become a hallmark of educational reform initiatives, and has not escaped reform efforts in career and technical education. Perkins III legislation requires that states develop evaluation systems to assess four core indicators of student performance, including academic and vocational achievement, program completion (e.g., high school graduation or postsecondary degree or certificate), successful transition from high school to postsecondary education and/or employment, and accessibility and equity. Although program evaluation is mandated, criticism exists about the criteria and methodology used to collect data, and the usefulness of evaluation results (Halasz, 1989). Indeed, collecting data to respond to these federal mandates can pose considerable challenges to career and technical educators. Gray (1999) notes that traditional outcome assessment measures—job and college placement rates—still dominate the criteria used to evaluate the effectiveness of career and technical education programs.

Practitioners also face substantial challenges in determining what state and local evaluation criteria (indicators) will be used, the specific data needed to reflect these criteria, methods of collecting it, and how to use it once collected. Some of the questions that require attention include: How is program *quality* defined? How should student outcomes or learning be measured? How will students enrolled in career and technical education course or programs be classified? What approach will be used to measure instructional practice? How will teacher quality be defined and measured? (Stasz, 1999).

Levesque, Bradby, and Rossi (1996) distinguish between formal evaluations traditionally conducted by outside evaluation experts, and performance indicator systems designed and maintained by local school personnel (see Table 4). Formal program evaluation tends to be comprehensive in scope and is usually designed to identify causal evidence about the impact of

particular strategies or activities. In contrast, data obtained from performance indicators tends to be descriptive and more global in scope.

> Performance indicators are statistics that indicate something about the performance or health of a district, school, or program. Indicators describe crucial educational outcomes, processes, and inputs, and typically appear as averages, percents, or rates. A performance indicator system establishes loose relationships among the outcome, process, and input statistics, and enables educators to monitor these statistics on an ongoing basis. Such a system helps to identify strengths and weaknesses and generates discussion about causes and appropriate improvement strategies. Ultimately, a performance indicator system produces evidence about whether strategies are working or not. (¶ 9)

Levesque and her colleagues (1996) identified a six-step program improvement process using performance indicators including (a) identifying local program goals, (b) identifying student outcomes, school practices, and school inputs, (c) identifying data sources and developing appropriate indicators, (d) interpreting data and developing improvement strategies, (e) engaging in discussion and debate about the results of data, and (f) establishing a program improvement process.

Table 4.
Comparison of Performance Indicator System and Formal Program Evaluation

Performance indicators	Formal evaluation
❑ Ongoing	❑ One-time or periodic
❑ Describes district, school, or program	❑ Formally evaluate a program
❑ Indicates progress and achievement	❑ Isolate the impact of particular activities
❑ Suggests areas for improvement	❑ May provide valid comparison of participants and nonparticipants
❑ Monitors changes over time	

Note. Information from Levesque et al. (1996).

Given current mandates and future projections, a conceptual framework in career and technical education would include performance indicators that examine legislative mandates and underlying philosophy, as well as specific outcomes, practices, and inputs. Halasz (1989) indicated that school culture and stakeholders' needs must also be considered. She concluded, "A variety of information should be collected (personal, instructional, institutional, societal, and so on) from multiple sources (teachers, students, administrators, parents) using multiple methods (survey, interview, participant observation, historical, archival)" (¶ 9). One challenge to career and technical teacher educators is to provide emerging teachers with the knowledge required to develop, implement, and maintain appropriate accountability systems.

SECTION VII.
SUMMARY, CONCLUSIONS, AND FUTURE STEPS IN REFINING A CONCEPTUAL FRAMEWORK FOR CAREER AND TECHNICAL EDUCATION

Most career and technical teacher educators acknowledge the need to revisit the basic assumptions, conceptual framework, and syllabi of existing preservice programs. Indeed, the entire profession must be willing and able to engage in ongoing examination of issues that contribute to a dynamic and relevant conceptual framework, e.g., philosophy, workplace demands, and skill requirements. The field's best thinking must be integrated into teacher preparation programs and, subsequently, into secondary and postsecondary classrooms comprised of a diverse clientele within the context of an increasingly sophisticated workplace characterized by a global economy—where success is directly tied to workforce readiness, the rapidly changing nature of jobs and required work skills, and increasing role of technology in the performance of work tasks (Lewis, 1997).

But, what exactly should teacher preparation programs prepare emerging teachers to do? This final section addresses that question from several perspectives. First, the impact of workplace changes on career and technical education and teacher preparation programs are summarized. Individual components of a tentative conceptual framework that were discussed in previous sections are synthesized, and the entire framework presented. Next, specific issues or components to include in curricula designed to address changes in work and education are proposed and discussed. Finally, issues to consider when planning for career and technical education curricula to be responsive to real and anticipated changes are examined.

Outline of Conceptual Framework for Career and Technical Education

There can be little doubt that the fundamental nature and structure of work and the economy, family life, and society continues to change at an ever-accelerating rate. The impact of these changes on career and technical education, while continuing to evolve, has already been dramatic. The National Board of Professional Teaching Standards (2001) summarized the characteristics of exemplary career and technical education curricula that addresses these fundamental changes in this manner:

> [Career and technical education] has changed from a field in which students worked in isolation on specific skills that were sometimes obsolete before even being tested in the marketplace to one in which students, under the guidance of accomplished teachers, work in teams on multidisciplinary projects that have broad applicability in the marketplace. Embracing this purpose, career and technical educators are attempting to avoid the narrow occupational specificity of earlier times and provide students with opportunities to envision a range of career paths in a variety of different industries. (p. 1)

Table 5 summarizes the main components of conceptual frameworks for career and technical education—past, present, and future. Historically, the conceptual framework of career and technical education has revolved around specific job training, clear distinctions between academic and vocational education, and preparing adolescents to transition from school directly to work. Curriculum and instructional approaches relied heavily on an essentialist philosophy—where students were viewed as products and taught in assembly-line fashion, much like the industries they were being prepared to enter.

Table 5.
Illustration of Components and Contents of a Conceptual Framework for Career and Technical Education from Past, Current, and Future Perspectives

Components	Career and technical education		
	Past	Current	Emerging
Purpose, theories, models	•Social efficiency (Snedden and Prosser) •Essentialism; scientific method •Serves employers' interests •Job training and preparation for less than a baccalaureate degree	• Pragmatism • Some aspects of progressivism (Dewey) • Preparation for work *and* post-secondary education and training (mostly associate degree)	•Pragmatism with reconstructivist strand •Progressivism •Critical perspective •Preparation for work *and* post-secondary education and training (for all levels inc., baccalaureate and graduate degrees)
Teacher education	•Work experience and job expertise paramount •Focus on job skills preparation •Teacher-directed instruction	•College education focusing on general and specific labor market preparation •Focus on academic and vocational skills instruction •Emphasis on contextualized and facilitated learning	•College education focusing on common core, specialized content area(s), and integrated academics. •Comprehensive approach to learning using occupations as modality •Emphasis on contextualized and facilitated learning
Curriculum	•Narrow focus on entry-level, job specific skills •Separate vocational content areas •Separation of academic and vocational education •Rigid prescribed curricula	•Four curricular strands: Education through occupations Integration of academics andvocational education Job-specific, entry-level training Tech prep •Dual enrollment	•Multiple options inc., curricular strands currently available •Common core of workforce education for all regardless of post-secondary plans •Integrated (academic-vocational) curriculum •Career clusters used to direct specialized instruction
Delivery options	•Behaviorism •Applied academics •Cooperative education	•Cognitive learning theory •Tech prep •Career academies •Work-based apprenticeships	•Multiple options available •Democratic ideals reflected in instructional content and process •Separation between school and work less distinct.
Clientele	•Alternative track for less academically able students •Increasing emphasis on special populations (peaking in 1984)	•Different programs and purposes for different student groups •*Moderated* emphasis on special populations tempered with phrases like "*all* students" and renewed use of quality standards •Multiple constituency groups	•Multiple constituency groups •Inclusion of all students with continuum of outcomes available
Student assessment	•Standardized and norm-referenced testing	•Standardized testing •Industry-based skill standards •Emergence of alternative assessments (e.g., portfolios, authentic assessment, etc.)	•Standardized testing •Established alternatives to assessment •Criterion-referenced testing
Program evaluation	•Quality based on industry standards •Job analysis	•State plans following guidelines established in federal career and technical education legislation	•Quality based on a variety of factors including dropout retention, graduation rates, job placement, transitions to postsecondary education •Occupational analysis

Note. Information for past components column adapted from Pratzner (1985).

In sharp contrast, the emerging conceptual framework reflects efforts at local, state, and national levels "to broaden vocational education—integrating the curriculum more closely with rigorous academics, improving articulation to postsecondary education (2-year and 4-year), and stressing long-term preparation for productive careers that will be subject to increasing technological change and economic reorganization" (Hoachlander, 1998, ¶ 1). Secondary career and technical education programs will continue a trend that focuses less on specific training for immediate entry-level employment upon graduation. Rather, secondary programs will provide more general knowledge about the workforce, career awareness, and exploration activities in specified career clusters, nurture higher order thinking skills development, and support students in making initial decisions about their career goals and in planning postsecondary activities necessary to achieve those goals. Postsecondary education, on the other hand, will remain in the best position to prepare students for specific jobs.[14]

Implications for Career and Technical Teacher Education and Teacher Education Programs

What, then, are the implications of the proposed conceptual framework for career and technical teacher education programs? In a word, they are substantial. Over a decade ago, Tozer and Nelson (1988) foresaw the necessity for career and technical teacher educators to engage students in activities that develop intellectual skills and understanding; to equip students with knowledge about and the ability to nurture communication, interpersonal, and reasoning skills; to ensure that emerging teachers are able to integrate academic and vocational curricula and provide their future students with options for postsecondary education, as well as for work; and to offer a broad base of knowledge and skills on pedagogy—including ideas about constructivism, tech prep, the interaction of academic and vocational content, etc. In fact, Tozer and Nelson posited that a new type of vocational educator was required—one who could provide instruction *through* vocations not merely *for* vocations. Thus, a well-prepared teacher was able to develop courses and programs that provide students with a broad perspective of the world of work. The use of generalizable skills, math, reasoning, and communication was considered the best vocational preparation for the majority of vocational students at the high school level.

While myriad other arrangements or contextual structures can address the question of which content to include or exclude in career and technical teacher education programs , a relatively simple, straightforward approach is to focus on the types of instructional content needed in emerging career and technical education programs in three areas: general workforce education, content area specialties, and professional teaching development. These three areas are broad enough to incorporate issues recognized as integral to the emerging vocationalism (see Table 6).[15]

General Workforce Education.

Aspects of teacher preparation curricula that focus on general workforce education assume that a substantial portion of the knowledge and experiences that define career and technical education cross specialty-area boundaries. A common core of knowledge about the world of work is assumed—stressing topics such as the function of work and family life in society; economics and systems of production and distribution; cultural aspects of work, the family, and society; development and application of higher order thinking skills, employability skills, and job seeking skills. The nature and underlying assumptions of general workplace education topics

suggest an integrative approach to instruction, where students from all vocational specialty areas are grouped together for classes. This approach should not only help emerging career and technical educators understand the need for a broad-based curriculum focus, but also nurture a sense of professional commonality and shared purpose.

Content Area Speciality.[16]

The clustering concept adopted by the U.S. Department of Education, the National Board for Professional Teaching Standards (NBPTS, 2001), and others reflects an ongoing effort "to organize the economy into coherent sectors that will facilitate the development and implementation of a national skills standards system" (p. 4). Regardless of the specific structuring system used, some form of content-area specialization will, in all likelihood, persist for career and technical education. While maintaining some aspect of "traditional" vocational education, emerging teachers will increasingly be exposed to something other than "business as usual" (i.e., entry-level job preparation for secondary students).

Teacher preparation curricula need to equip preservice teachers with the tools and experiences necessary to integrate academic and vocational education, prepare students for entry into the workforce, *and* support the successful transition of students from high school to 2-year or 4-year postsecondary educations. Regardless of the specific curricula and structure of teacher preparation programs, all must satisfy three essential requirements: They must prepare emerging educators to (a) address the long-term prospects of students—not just entry-level jobs, (b) encourage high levels of academic proficiency and mastery of sophisticated work-based knowledge and skill, and (c) preserve the full range of postsecondary options for program participants (Hoachlander, 1998). No small task.

Table 6.
Possible Curricula Components in Career and Technical Education (CTE) Teacher Preparation

GENERAL WORKFORCE EDUCATION	CONTENT AREA SPECIALTY	PROFESSIONAL TEACHING SEQUENCE
Foundations and philosophy of CTE (including the changing nature of the work place, the new economy, etc.)	Entrepreneurship (as a general concept regardless of occupational cluster area)	Contextualized teaching and learning
Communication/interpersonal skills necessary in the work place	Knowledge associated with career clusters[a] • Agriculture and environmental sciences • Arts and communications • Business, marketing, information management, and entrepreneurship • Family and consumer sciences • Health services • Human services • Manufacturing and engineering technology • Technology education	Tech prep
Communication, interpersonal, and leadership skills required when dealing with various constituencies (e.g., parents, colleagues, business leaders)		Integration of academic and vocational education
CTE teacher as change agent in school and community (e.g., advocacy, public relations, etc.)		Work-based learning (e.g., apprenticeship, cooperative education)
Higher-order thinking skills such as problem-solving and decision-making		Articulation of secondary–postsecondary, school–business instructional arrangements
School-to-work transition issues for ALL students		Student assessment (formal, informal, and alternative assessment methods) and program evaluation
Balancing work and family life		Working with diverse student populations
Employability skills (workforce readiness)		Professional development (notion of lifelong learning)
Acquiring a sense of social justice regarding the effects of work on individuals and in society		Classroom management

[a]Adapted from the National Board for Professional Teaching Standards (2001). While a useful taxonomy that is relevant to teacher preparation programs other organizational structures have also been proposed, e.g., the National Skill Standards Board proposes 15 large economic sectors to structure vocational specialization (Hoachlander, 1998). The U.S. Department of Education has established 16 career cluster models designed to introduce students to entry through professional-level occupations in a broad industry area.[17]

Professional Teaching Sequence

In addition to general coursework on teaching and learning (e.g., psychology of learning, social foundations of education, curriculum development, instructional methods), career and technical educators must be able to incorporate an array of possible teaching strategies in classroom, laboratory, and work-based settings. Traditional teaching approaches will need to be supplemented, with greater emphases on emerging pedagogical approaches such as integrating academic and vocational education, tech prep (including program articulation between secondary and postsecondary institutions), and contextualized teaching and learning forums. Knowledge about the diversity of students and school settings will continue to be a critical element in adequate teacher preparation, and will need to expand in scope in the years to come. Attention will also need to be paid to assessment issues—most notably, high-stakes testing and accountability issues related to school reform efforts. Ramsey et al. (1994) wrote that "teachers also need to be trained in the use of teaching techniques that support activity-based learning, including hands-on experiences, problem-solving, cooperative or team-based projects, lessons requiring multiple forms of expression, and project work that draws on knowledge and skills from several domains."

Given the nature of actual and proposed changes to career and technical education curriculum, the professional teaching sequence of courses should be delivered in a mixed student environment. Like the topics contained in the general workforce education segment of the curriculum, pedagogical knowledge and skills are not unique to any one vocational specialty area. Rather, pre-service teachers can benefit from the different perspectives attributed to various specialty areas.

Role of Teacher Educators

Successful implementation of recommended changes to career and technical teacher education programs, as well as to the field as a whole, requires that professionals recognize the slow and difficult process of reform. Teacher educators must be especially aware of and understand how to successfully negotiate the change process. A strong effort should be made to ensure that emerging teachers are aware of workplace inequities and are able to change them, when possible.

To bridge the sometimes-considerable gap between cutting-edge thinking and current practice teacher educators can facilitate programmatic change at both regional and national levels—serving as liaisons between *what is* and *what should be*. Otherwise, the academy may prepare emerging teachers to (a) understand a *new* career and technical education, but be ill-prepared to cope with current classrooms reflecting traditional practice, or (b) be wholly prepared for traditional curriculum and school environments, but lacking an understanding or ability to implement emerging issues and practices. Teacher educators must actively work to bridge the gap between current and desired practice through in-service training and staff development, advocacy efforts, and other means of advancing information about curriculum adjustments and reform.

Final Words

Using the historical record to identify issues and direction for developing a conceptual framework of career and technical education reveals how little the field has actually evolved—at least in terms of philosophical, conceptual, and theoretical underpinnings, from its inception to the present.

While this situation is beginning to change with the development of tech prep and academic-vocational integration models, and so forth, many of the same positions, issues, and arguments for and against school-based occupational preparation common around the time of the Smith-Hughes Act of 1917 are still in contemporary writings. The perennial nature of these issues may reflect the field, i.e., an applied area of study that reflects current and emerging issues and practices found in the workplace. Examples of other types of perennial issues that will influence the final draft of the conceptual framework for career and technical education include:

- Who should be served by career and technical education? Clichés and rhetoric must be discarded in favor of sound, thoughtful positions that are implemented and successful, rather than merely spoken.

- Will career and technical educators embrace democratic education principles first espoused by John Dewey, wherein students are taught to critically analyze work (e.g., labor unions, work and career exploration, and the economy) and participate in society, or passively accept the status quo, in which workers are often exploited by industry (Kincheloe, 1999).

- What should the nature of career and technical education be at the secondary level? At the postsecondary level? Should secondary programs reflect a broader type of workforce education (e.g., Copa & Phlihal, 1996) or should other alternatives—e.g., specific job training for work-bound and disadvantaged youth, or education through occupations (Grubb, 1997)—be implemented? A broader question might be, "Can, or should, career and technical education be all things to all people?"

At the dawn of a new century, it seems appropriate to take stock in the future of career and technical education. Many authors—those referenced in this work along with myriad others—have contributed to an ongoing dialogue about the nature of contemporary and future career and technical education. Ideas and options have been proposed, articulated, and studied. Yet, action is slow. The development of any conceptual framework is of little value if action does not result. Collectively, the field must be willing to tackle tough questions and debate potentially contentious issues delineated in the professional literature to arrive at and then maintain a clear and concise framework. Such a framework can guide funding priorities, program development, classroom instruction, and relationships with external constituencies. To do otherwise runs the risk of glossing over fundamental issues and concerns, repeating the same arguments and issues for another century, or, perhaps worst of all, allowing others (e.g., federal and state government, funding agents, and business and industry leaders) to make decisions for the field.

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ENDNOTES

1. Interestingly, Prosser (1913) argued that job- or skills-specific vocational education could also make schools more democratic "when we learn to train all kinds of men, in all kinds of ways, for all kinds of things" (p. 406).

2. The terms *vocational education* and *career and technical education* are used interchangeably. However, most references to historic events or thought use the term vocational education in an attempt to preserve the integrity and intent of past authors' work.

3. The historical information, descriptions, and interpretations of the history of vocational education/CTE that appear in this paper are not novel, nor do they provide ground-breaking new insight into the history of public vocational and technical education. In fact, a dozen or more of the references used in this paper provide more detailed and interpretive accounts than the one offered here. However, it is important to outline the beginnings and progression of the field from historic and philosophic perspectives because they lie at the heart of any conceptual framework for career and technical education now or in the future (Gray, 1999; Miller & Gregson, 1999).

4. Differences aside, Prosser and Dewey shared certain beliefs about vocational and technical preparation. Both agreed that the schools of the early 1900s were in desperate need of change. They also shared a belief that education should be geared toward occupational preparation, and become more democratic, and both preferred practical programs that mirrored real-life situations for a large segment of the population (Miller, 1996; Sarkees-Wircenski & Scott, 1996; Wirth, 1980).

5. Prosser was actually a student of Snedden, a social-efficiency advocate who believed that public vocational education should respond directly to the specific labor needs of business and industry (Hyslop-Margison, 2000).

6. The use of diagrams to visually represent abstract and complex ideas always carries the potential to create as many problems as it resolves. Therefore, this or any other graphical display of a conceptual framework for career and technical education should be viewed as being tentative at best.

7. This particular view of essentialism was advanced by Prosser as applied to vocational education (Sarkees-Wircenski & Scott, 1995), and does not align directly with modern views of essentialism that focus on a basic, teacher-centered, non-applied academic curriculum. While differences exist, the underlying intent of the philosophy appears to be maintained, i.e., a sequenced, organized, and rigid curriculum directed by teachers or others.

8. Career clusters include: agriculture and natural resources; architecture and construction; arts, A/V technology and communication; business and administration; education and training; finance; government and public administration; health science; hospitality and tourism; human services; information technology; law and public safety; manufacturing; retail/wholesale sales and service; scientific research/engineering; and transportation, distribution, and logistics (OVAE, 2000).

9. While the 2+2 design is the most common in tech prep, a variety of other arrangements can be implemented. According to the Perkins Act, tech prep programs have 7 elements: (a) an articulation agreement between secondary and postsecondary consortium participants, (b) a 2+2, 3+2, or a 4+2 design with a *common* core of proficiency in math, science, communication, and technology, (c) a specifically developed tech prep curriculum, (d) joint in-service training of secondary and postsecondary teachers to implement the tech prep curriculum, (e) training of counselors to recruit students and to ensure program completion and appropriate employment, (f) equal access of special populations to the full range of tech prep programs, and (g) preparatory services such as recruitment, career and personal counseling, and occupational assessment (U.S. Department of Education, 2001).

10. Johnson and Wentling (1996) highlighted the reasons for an "intensifying dissatisfaction with testing in education" (p. 151). They include (a) a tendency for conventional testing to promote memorization rather than understanding, (b) an emphasis on rote learning through drill and practice exercises, (c) an inability of traditional tests to assess problem-solving and other higher order thinking skills, (d) the notion that there is always a right answer, problems are well-structured, and teachers always know the right answers, and (e) a narrowing of curriculum as teachers teach to the test and learners.

11. Kincheloe (1999) suggests that the conversation about the global (post-industrial or post-Fordist) economy and the need for high skill employees may be more hype than reality. He writes, "Still, at the end of the twentieth century, only about one out of every ten jobs in the American workforce has been reconceived in a more dynamic and flexible manner" (p. 148). "Current projections indicate that the majority of jobs that will be created in the early years of the twenty-first century will require low-skill workers" (p. 17).

12. The School-to-Work Opportunities Act of 1994 was originally designed to help work-bound high school students successfully transition to full-time employment. "However, the real impact of school-to-work seemed to come through raising educators' awareness of the need for school-sponsored activities to improve student career maturity" (Gray, 1999, p. 163).

13. The definition of *students with special needs* or *special populations* has expanded over the years. The definition found in Perkins III [Sections 3(23) and 3(14)] is used throughout this paper: "Individuals with disabilities, economically disadvantaged individuals (including foster children), individuals preparing for nontraditional employment, single parents (including single pregnant women), displaced homemakers, and individuals with other barriers to educational achievements, including individuals with limited English proficiency." The current definition is more comprehensive and less restrictive that the definition applied in the 1968 Vocational Education Amendments to the Vocational Education Act of 1963 (Fjellheim, 2000).

14. This scenario presents a dilemma where special student populations (i.e., students with disability, economic, or academic disadvantage, etc.) are concerned. On one hand, schools are often accused of perpetuating the status quo, ensuring that less advantaged students remain in lower status academic programs. From this perspective, secondary career and technical programs that prepare students directly for the world of work may actually be narrowing participants' employment and, hence, life options. On the other hand, career and

technical programs that prepare all students for some type of postsecondary education may neglect the specific needs of those individuals who either cannot or will not pursue such experiences. The real dilemma then is this: Do secondary career and technical educators offer programs for students with special needs or risk of school failure that provide entry-level skill training and preparation, even though the preparation may either be inferior to other programs or restrict participants' career futures? Are different career and technical programs offered, depending on student population—resulting in a two-tier delivery system? Can an integrated type of curriculum be provided that benefits all participants, regardless of status or postsecondary plans? While a complete answer is beyond the scope of this document, any conceptual framework in career and technical education must be broad enough to (a) provide educational experiences on the topic and (b) provide educators with the mental tools to resolve this and related issues on the local level. A possible alternative to an all-or-nothing approach (i.e., either tech prep focusing on transition to postsecondary employment, or work skills programs designed to prepare youth for entry-level jobs upon graduation) is arranging program options on a continuum reflecting two intersecting dimensions—educational setting (age of participants) and scope of curriculum. While not comprehensive, Figure 4 provides examples of programs that can be made available when considering institutional and instructional focus.

BROAD

SECONDARY	POSTSECONDARY
• New vocationalism? • Understanding of work ethic • Tech prep (transition to postsecondary education) • Integration of academic and vocational education • Transition from school to postsecondary education • Workforce education • Education through occupations • Career awareness and exploration • SCANS skills	• Career exploration activities? • Education through occupations
• Transition directly from school to work • Emphasis on work-bound youth? • Specific job skills training efforts • Apprenticeship • Disadvantaged programs?	• Short-term training programs • Certificate and degree programs • Job training and retraining • Welfare-to-work programs • Job placement

NARROW

Figure 4. Curricular emphases when considering instructional and institutional focus for career and technical education: competing or compatible goals?

15. This discussion does not examine requirements for undergraduate students' first 2 years, nor requirements for alternative certification. The most common recommendations often refer to a general exposure to higher academics, and are called by various terms, including general studies, liberal arts, or liberal studies. The intent of this type of education is to provide a breadth of knowledge and experiences.

16. The 16 U.S. Department of Education career clusters are: agriculture and natural resources; arts, audio-video technology, and communications; business and administrative services; construction; education and training; financial services; health science; hospitality and tourism; human services; information technology services; legal and protective services; manufacturing; public administration and government; retail/wholesale sales and service; scientific research, engineering, and technical services; and transportation, distribution, and logistics services.

17. The National Board for Professional Teaching Standards (NBPTS, 2001) states that career clusters provide "the basis for issuing industry-recognized, portable credentials and career majors in a national school-to-work system designed to develop a world-class work force" (p. 4). The underlying rationale used by the NBPTS "stems from the notion that career and technical education should prepare students, not just for a first job but for a promising career within a particular sector of the economy. Thus, teachers need to be broadly grounded in their outlook and their practice to afford their students this more ambitious sense of possibility and the wherewithal to take productive first steps in the marketplace" (p. 4).